wos Library

FEB 14 1948

the OIL AND GAS JOURNAL

"Freedom from variation or difference."
For the finest motor fuel blend, use
WARREN STABILIZED NATURAL GASOLINE
WARREN
PETROLEUM CORPORATION
ATURAL GASOLINE • Iso-Pentane • Normal Butane • Iso-Butane • Propane • Hexane • STA-VOL-ENE
WARREN PETROLEUM CORPORATION
Export Terminals: Corpus Christi, Port Arthur, Baytown, Texas City, and Norsworthy, Houston, Texas; Lake Charles, La.; Marcus Hook, Pa.
TULSA 2, OKLAHOMA
CABLE ADDRESSES: Stavolene, Warren
Crude Oil, Natural Gasoline and Liquefied Petroleum Products

PRICE 20 CENTS

TABLE OF CONTENTS PAGE 51

FEBRUARY 12, 1948

LANE-WELLS

128 SHOT

SEMI-SELECTIVE

GUN PERFORATOR

HERE ARE SOME OF THE COMBINATIONS
of zone selectivity and perforation densities provided by Lane-Wells D-1 Gun on a single trip in the hole

6 HOLES PER FOOT
Up to
4 individual 64" zones
or 2 – 128" zones
or 1 – 192" zone plus 1 – 64" zone
or 1 – 256" zone

12 HOLES PER FOOT
2 – 64" zones
or 1 – 128" zone
or 1 – 64" zone plus 2 – 64" zone with 6 holes per foot

18 HOLES PER FOOT
1 – 64" zone plus 1 – 64" zone with 6 holes per foot

24 HOLES PER FOOT
1 – 64" zone

The Lane-Wells Type D-1, 128-shot, Gun Perforator has been developed to meet field requirements for faster gun perforating with some degree of selectivity on big-hole jobs.

The gun is fired in groups of 32 shots, vertically spaced at six shots per foot. Each group provides a fixed spiraled pattern with 60° between adjacent perforations.

- **128 shots every run.**
- **Shot density – 6, 12, 18, 24, etc. shots per foot.**
- **No loss in penetration regardless of the number of shots fired.**
- **Unparalleled time-saving.**
- **Multiple zone perforating on single trip.**

Ask your Lane-Wells representative to show you how effectively you can save rig time – and get better results – with *the right* Gun for your particular job.

Tomorrow's Tools – Today!

LANE WELLS COMPANY

LOS ANGELES • HOUSTON • OKLAHOMA CITY
24-HOUR SERVICE *General Offices, Export Offices and Plant* 45 BRANCHES
5610 S. SOTO ST., LOS ANGELES 11, CALIFORNIA

the OIL AND GAS JOURNAL

published weekly by the

PETROLEUM PUBLISHING COMPANY

211 S. CHEYENNE AVE., TULSA 1, OKLAHOMA

FOUNDED IN 1910 BY PATRICK C. BOYLE

Subscription rate to the petroleum industry, United States and foreign, 1 year, $3.00. Single copies, 20 cents. Back copies, when over a year old, 50 cents. Note: Payments from outside the U.S.A. may be in the form of an international money order or check on a U.S.A. bank. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879. Copyright 1948 by The Petroleum Publishing Co.

Vol. 46, No. 41 February 12, 1948

P. C. LAUINGER, *President*
C. O. WILLSON, *Editor*
S. H. ROURKE, *Business Manager*
KENNETH B. BARNES, *Engineering Editor*
W. L. NELSON, *Technical Editor*
PAUL REED, *Pipe-Line Editor*
HENRY D. RALPH, *News Editor*
ARCH L. FOSTER, *Refining Editor*
New York 17, 415 Lexington Ave.

Associate Editors

LYNN M. NICHOLS
NEIL WILLIAMS
CHARLES J. DEEGAN
R. B. TUTTLE
D. H. STORMONT
C. DUDLEY JOHNSTON, *Staff Artist*

District Editors

T. A. ARMSTRONG
GEORGE WEBER
J. W. CLOTE
CARL F. HOOT
L. S. McCASLIN, Jr.
Dallas 1, Mercantile Bank Bldg.
JOHN C. CASPER
Tulsa 1, 211 S. Cheyenne
O. C. PRESSPRICH
Saginaw, News Bldg.
DAHL DUFF
ED SHORT
HERNDON DAVID
Houston 2, Sterling Bldg.
Los Angeles 15, 1406 S. Grand Ave.
WARREN W. BURNS
BERTRAM F. LINZ
New York 17, 415 Lexington
Washington 5, 821 Albee Bldg.
TOLBERT R. INGRAM
VICTOR LAURISTON
Denver 11, 4558 Alcott St.
Chatman, Ont., 35 Stanley Ave.
POLLYANNA DE ARMOND
ESSIE MAE ABBOTT
Editorial Assistants

Advertising

WAYNE RIVES, *Manager*
Houston 2, Sterling Bldg.
MITCHELL TUCKER, *Eastern Manager*
New York 17, 415 Lexington Ave.
C. R. FARMER, *Chicago Manager*
Chicago 2, 185 W. Madison
ALFRED MILTON JONES, *New York Representative*
New York 17, 415 Lexington Ave.
E. S. KLAPPENBACH, *Chicago Representative*
Chicago 2, 185 W. Madison
J. HOWARD TINKHAM, *California Manager*
Los Angeles 15, 1406 S. Grand Ave.
CHARLES A. WARDLEY, *Pittsburgh Manager*
Pittsburgh, 435 Fourth Ave.
M. W. LIBHART, *California Representative*
Los Angeles 15, 1406 S. Grand Ave.
A. J. CHAMBERS
Beckenham, Kent, England
33, The Avenue
JOHN D. REILLY, *Tulsa Representative*
Tulsa 1, 211 S. Cheyenne Ave.
J. PARKER HOLLAND, *Production Manager*
Tulsa 1, 211 S. Cheyenne Ave.

Member
Audit Bureau of Circulations
Associated Business Papers

Table of Contents

NEWS DEVELOPMENTS

Record Demand Emphasizes Need for Texas Unitization Law 54
House Group Studies Fuel Prices; Asks More Steel 55
Krug Bill Would Exchange State for Federal Offshore Leases 56
Texas Commission to Study Higher MER's 56
Foreign Aid Estimates Cut; Approval Is Pressed 58
Government Synthetic-Fuel Plan Will Aid Industry 59
Lincoln Expert Finds No Link With Petroleum 59
Drop in Over-All German Output Overshadows New Emsland 60
Second Egyptian Test Brought In as Producer 60
Strike Halts Operations in Colombia 61
Immediate Increase in European Refining Capacity Needed 62
Oil Hearings Touch on Pipe Exports, Synthetics, Tidelands 64
Bill Asks Government to Retain Rubber Plants 64
Texaco Now Licensing Process for Synthetic-Fuel Production 68
FPC Deadlocked Over Proposed Gas-Act Amendments 71
Hallanan Names Committees to Combat Fuel-Oil Shortage 71

Editorial 53
This Week 57
International News 60
Watching Washington 66
Pipe-Line News 117
Natural-Gas News 120
Natural-Gasoline News 120
Refining News 126

ENGINEERING AND OPERATING

Pressure-Maintenance Project Operates on Cooperative Basis 76
Straight-Line Chart Method of Absorption Analysis 78
Oil Prospects in Utah 87
Questions on Technology 97
Some High Points in Gasoline-Plant Design 98
Modern Rotary Drilling—Rotary-Bit Performance 105
Engineering Fundamentals—Relative Permeability Ratio 107
The Refiner's Notebook—Viscosity of Vapors 109
Oil and Gas Equipment Digest 111

EXPLORATION AND DRILLING

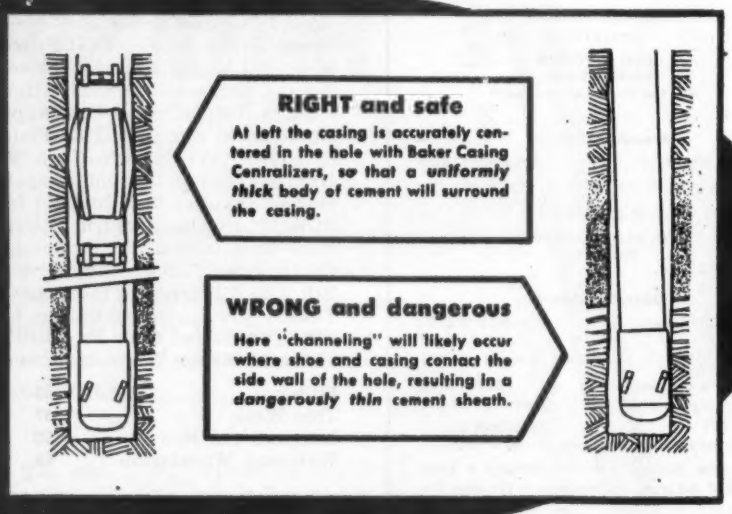
Straws in the Exploration Wind 129
Highlights of Week's Developments 129
Reports by Areas Start on Page 130
Weekly Well-Completion Record 148
Daily Average Production for Week 149

ADDITIONAL FEATURES

Personals 73
Deaths in the Industry 75
Drilling Contractors 123
Market Summary 150
Equipment Men in News 152
Classified Advertising 154
Calendar of Events 158
Advertisers' Index 158

You can't PUSH me around, but you can LEAD me wherever you like

And that is just one of the reasons for the outstanding success of the Baker Casing Centralizer! It is NEVER PUSHED either when the casing is being run into the well, or when passing collars while conditioning the hole and cementing. It is always PULLED through the casing or past any restriction in the open hole. Another important advantage is that the springs on Baker Casing Centralizers are *free to rotate around the casing* and are not forced to rotate with the casing if it turns while being run in the well. This means that the springs never tend to ball up and form a bridge from shearing the mud cake from the wall of the hole; they are not twisted, flattened, deformed or torn loose, but are ready to *hold the casing accurately centered in the hole* when cementing is performed.


RIGHT and safe
At left the casing is accurately centered in the hole with Baker Casing Centralizers, so that a uniformly thick body of cement will surround the casing.
WRONG and dangerous
Here "channeling" will likely occur where shoe and casing contact the side wall of the hole, resulting in a dangerously thin cement sheath.

It's easy to start right

Just get in touch with the Baker representative nearest you for competent assistance in determining where Baker Casing Centralizers should be installed. They are quickly and easily spot welded on the casing by following simple directions given on the tag attached to each Centralizer. — And you then know that you are "well insured" against danger or failure when the cementing job is performed.

WHY CENTER CASING? It is inexpensive and positive insurance to place one Baker Casing Centralizer, Product No. 910 just above the shoe, and a sufficient number of Centralizers on the casing to be certain that the casing is centered in the hole over the entire vertical area to be cemented.

Wherever the shoe, or the casing, either *rests against* the side of the hole — or is *too close to the side wall* — you are in danger of channeling which usually results in cementing failure; see illustration above.

With Baker Casing Centralizers installed over the critical area, the casing is accurately centered in the hole, and conditions are most favorable for encasing the pipe with a uniform sheath of cement of maximum thickness — with best chances for success.

BAKER Casing Centralizer

Product No. 910

BAKER
OIL TOOLS, INC.
Houston • Los Angeles • New York

THE OIL AND GAS JOURNAL

Middle Distillates

THOSE responsible for the voluntary agreement program adopted by the National Petroleum Council and approved last week by the Department of Justice under Public Law 395, had the future in mind when they recommended: "The rate of growth in demand for middle distillates must be checked. Since there is an over-all shortage of supply of middle distillates, placing additional demands against the industry cannot but aggravate an already acute situation."

In a few weeks the fuel emergency for this season will be behind us and what then? The industry is being permitted to work itself out of this emergency with its own remedies, but intervention by Government is practically a certainty should oil-fuel supplies fall short of demands another year. The bills introduced in Congress, questions propounded at hearings, and the proposed 9-billion-dollar synthetic program reflect the consumers' interest in oil supplies and also how quickly public hysteria could become dominant in arriving at remedies for shortages.

Our present troubles stem from the unexpectedly heavy demands for the middle distillates. The latest Bureau of Mines report shows that for the last 11 months of 1947 the domestic demands for products classified as distillate and kerosine increased 59,230,000 bbl. over the same period in 1946, or 20.5 per cent. This compares with a gain of 53,623,000 bbl. in gasoline. Thus the volume increase in refinery yields of what for years were minor byproducts was greater than the gain in demands for the industry's principal product. The tail wagged the dog and shortages were inevitable.

A few figures will show what this means in 1948 operations. To take care of this year's requirements crude runs to stills averaging 5,346,420 bbl. daily will be required. Gasoline yields of 39.8 per cent are projected. If conditions would permit the 1939 gasoline yield of 45 per cent, gasoline needs would be supplied with crude runs to stills of 4,728,500 bbl. daily, a reduction of 617,920 bbl. from the figure that has been projected for this year.

With this prewar standard of operation there would remain, after the gasoline recovery, sufficient kerosine for normal uses, distillates for the enlarged diesel markets, lubricants, and other essential products with approximately 35 per cent of the barrel of crude oil remaining for furnace oils and residual fuels.

It will be pointed that since the war's end we have acquired hundreds of thousands of new fuel customers who would not be provided for under this prewar refinery operation schedule. To the extent that heaters have been installed which cannot be converted to other fuels this is true and must be taken into consideration in providing future supplies. But this comparison does reveal that the future demand for these fuel products should not be permitted further to expand until it becomes a Frankenstein creating shortages and controlling in all petroleum operations.

Record Demand Emphasizes Need for Unitization Legislation in Texas

by Dahl M. Duff

THE current record demand for petroleum and its products and efforts of the industry to maximize production have again drawn attention to the need in Texas for oil unitization legislation which could conceivably add as much as a billion barrels to the state's recoverable oil.

A bill for permissive pooling of oil properties failed to pass the last legislature, but indications are that a similar measure will be placed before the state's lawmakers early next year. Clear-cut legislative authority sanctioning oil-field unitization is considered to be a necessary initial step toward the greatly improved recoveries which, in many reservoirs in Texas, are economically and technically possible only under joint operation.

The figure of a billion barrels additional recoverable oil resulting from unitization is admittedly pure estimate. Texas' present proven reserves are calculated to be in excess of 11 billion barrels. This total is heavily weighted by several large reservoirs, particularly East Texas, and many Gulf Coast fields with active water drive have less need for unit operation in order to increase recoveries.

Thus, out of a possible three or four billion barrels in fields feasible to unitize, a billion barrels additional recovery is within the realm of possibility, even considering pools where no agreement would be reached for one reason or another. This realization is, of course, a long-term prospect. Even with favorable legislation, several years undoubtedly would elapse before many programs would become effective.

One indication of the possibilities was given by engineers in testimony during hearings on the unitization bill in the last legislature. Statements were made that if a field-wide repressuring program were conducted in Fullerton field in West Texas, ultimate production would be increased by some 50,000,000 bbl. Proportionate good results could be obtained in many other fields, according to the testimony.

Present Situation Negative

The present situation with respect to pooling oil properties in Texas is entirely negative. The state's regulatory laws are based primarily on the prevention of waste and the promotion of conservation, and there is nothing expressly forbidding pooling as such.

What has discouraged unit operation are the state's actively enforced antitrust laws. Even though blessed as a conservation device, some oil-company legal advisers feel unit operation agreements could later be made the basis for prosecution. All unitization programs involve cooperative action for selective production and sharing the proceeds on a formula plan, and it is feared this might be attacked as an illegal combination.

Actually, there is some difference of legal opinion on the question of whether it is safe to proceed with the joint operation of oil properties in Texas in the absence of definite statutory authority. Generally, the failure of the legislature to declare that unitization in the interests of conservation does not violate the antitrust laws has been sufficient to discourage widespread unitization.

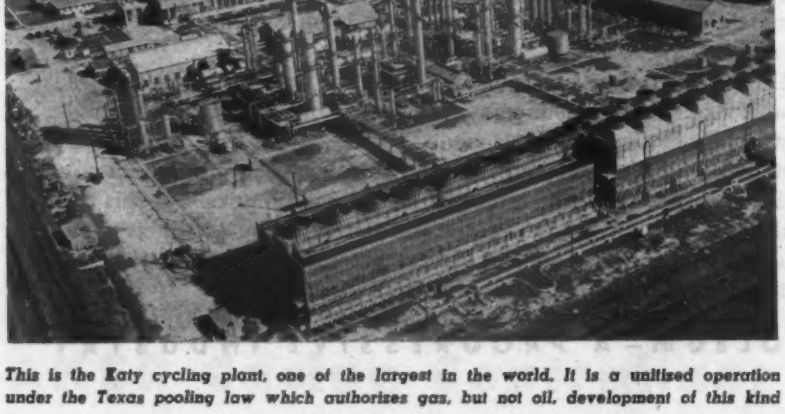
As far as the strictly gas-producing properties are concerned, there is now a law in Texas which specifically authorizes joint operation with the approval of the attorney general. This was enacted in 1935 prior to the development of many modern secondary-recovery techniques, and presumably the state's legislators at that time saw no need for a similar statute applying to oil properties.

Although cycling is not mentioned directly, many projects of this nature have been undertaken under authority of the gas-field pooling statute. The outstanding example is Katy gas field, where the largest cycling operation in Texas—and one of the largest in the world—is conducted. About 30,000 acres and a number of different interest holders are involved.

Bill Mild in Comparison

The bill offered in the Fiftieth Texas Legislature a year ago was mild in comparison with the unitization laws already on the statute books in some other states, notably Oklahoma and Louisiana. The Texas bill provided only for permissive pooling of oil properties, thus giving any single interest the right to refuse participation. In Louisiana and Oklahoma the state regulatory agencies are empowered to require unitization under certain circumstances.

H.B. 67 was backed by various engineer and technical groups. The opposition was based largely on a contention that it would weaken the antitrust laws. Some opposition came from royalty owners who feared that they would be swallowed up in a program of joint operation. One the other hand, the proposal was supported by some royalty owners who had experienced the benefits resulting from the Katy operation.



This is the Katy cycling plant, one of the largest in the world. It is a unitized operation under the Texas pooling law which authorizes gas, but not oil, development of this kind

While the bill was before the legislature, it was submitted to the attorney general. His unfavorable opinion resulted in the inclusion of the King amendment sponsored by Rep. Leslie King, Harrold. This provided that if the courts found any agreement entered into under the act not to be a "reasonable exception" to the antitrust laws, then the unitization act and not the antitrust laws would be invalidated. Conversely, agreements found to be a "reasonable exception" would not be in violation of the antitrust laws. Despite this amendment and a favorable opinion on it by the attorney general, the bill died in a conference committee.

H.B. 67 was introduced by Rep. L. R. Pierson, Ranger. A companion bill was offered in the Senate by Sen. W. R. Cousins, Jr., Beaumont. It authorized cooperative development agreements which would be approved by the Railroad Commission. Back of efforts to obtain passage of H.B. 67 in the Fiftieth Legislature was the program of the Texas Railroad Commission initiated about a year earlier and designed to promote utilization of casing-head gas. Data obtained by survey committees set up by the commission showed that a unitization law would further conservation along this line.

In a speech several months ago, W. J. Murray, Jr., commission member, declared that the application of presently known methods together with research is essential in improving oil recovery.

"In many fields, we are not putting into practice techniques of pressure maintenance, repressuring, water injection, and reservoir control which we know would increase recovery and be economically sound.

"Most of these failures to adapt proven conservation measures relate, I believe, the need for a more enlightened public opinion. If the public can be informed of the need for conservation and can have a reasonable understanding of the process, they will—while standing firm against abuses and against any real antitrust violations—nevertheless see to it that no unreasonable federal or state regulation stands in the way of true conservation."

House Group Studies Fuel Prices; Asks More Steel for Production, Refining

WASHINGTON.—The House interstate commerce committee last week used a "progress report" on its petroleum investigation as a springboard for a proposed probe of increases in fuel-oil prices by the Department of Commerce.

The suggestion was one of five made by the committee after hearings at which federal officials reported on the manner in which the program it laid down last December is being carried out. In those suggestions the committee called for:

1. Action by the Interior Department to secure promptly from the oil industry its program to meet shortages of gasoline which are expected to occur this spring and summer.

2. Immediate consideration by the Government as to whether steel should not be allocated for expanded production, refining, and distribution facilities rather than for petroleum-consuming equipment.

3. A survey by the Maritime Commission of the adequacy of the tanker fleet to meet the requirements of coming years, particularly with regard to additional tanker construction necessary in case existing and proposed Middle East pipe lines cannot be operated.

4. Prompt reorganization of the Department of Commerce export control procedures over petroleum and products, and their extension to crude and lubricating oils.

Reporting for the committee, Chairman Charles A. Wolverton noted that the industry had perfected a voluntary agreement which had been given Department of Justice clearance, and commented "it is up to industry speedily to make use of these tools it has asked for in clearing up this emergency."

Oil-Consuming Equipment Study

Wolverton called for a study by governmental agencies of whether further installations of oil-consuming equipment should be temporarily suspended, and the committee's views in that respect were promptly supported by the House, which wrote into the independent offices appropriation bill then under consideration a prohibition against expenditure of any funds for conversion to oil or natural gas of heating installations in any buildings owned or rented by the Government.

While it touched upon a number of matters, price was the major subject of discussion in the report, with Wolverton declaring that recent increases have justified the committee's concern, expressed last year over the possibility of higher prices in the face of the shortage. Many complaints respecting prices, "particularly regarding extraordinary prices asked by some local dealers," have been received, he said, and the committee has asked the state fuel coordinators for further information.

Wolverton declared also that the Secretary of the Interior and Attorney General should exercise vigilance over voluntary industry agreements "so that present and expected petroleum shortages are not used to undermine the competitive position of independent refiners and dealers."

Ignoring entirely the long drawn-drawn-out investigation by Sen. Kenneth S. Wherry's small business subcommittee, Wolverton outlined the complaints that have come in of refusal of major companies to sell crude to independent refineries except under processing contracts calling for sale to the major of the more desirable products, and the inability of dealers and consumers to secure supplies from their customary independent refinery sources.

"The study recommended by the committee should be undertaken promptly," he said. "It will be incumbent upon the Congress to consider to what extent the free play of competition in the petroleum industry can be relied upon in the light of present and anticipated shortages. Protection of customers against general unwarranted nation-wide price increases by the industry and overreaching on the part of individual companies and dealers in shortage areas is a matter of constant concern."

Bill Seeks Reopening of "Section 36" Controversy

WASHINGTON.—Legislation which would reopen the long drawn-out proceedings over the ownership of Section 26 in Elk Hills naval reserve has been introduced in the House of Representatives by Congressman Ernest K. Bramblett of California and may be brought up for consideration when Congress is asked to approve the expansion of the reserve sought by the Navy Department.

Bramblett's bill would direct the federal District Court for the Southern District of California to reopen the case brought by the Interior Department against Standard Oil Co. of California, upon application by any of the defendants filed within a period of 6 months, and, notwithstanding any previous action by that court, the Ninth Circuit Court of Appeals or the Supreme Court, determine the rights, titles, and interests of various parties to the land and in particular determine whether the section was or was not known to be mineral in character on January 26, 1903.

The measure also clears the way for appeals from any decision of the District Court through the Appellate Court and to the Supreme Court.

Krug Bill Would Exchange State For Federal Offshore Leases

WASHINGTON. — Proposed legislation to permit issuance of federal leases for oil prospecting and development in the tidelands and Continental Shelf not withheld as military oil reserves or for purposes of navigation was sent to the Capitol last week by Interior Secretary J. A. Krug.

The bill would provide for exchange of state for federal leases by persons now operating in the California tidelands and would return to that state 37½ per cent of the income from operations within its boundaries.

Major features of the bill are:

Leases for lands not within any known geological structure of a producing field will be limited to 64,000 acres but within 3 years the area must be reduced by at least half and before the end of the fifth lease year to not more than 7,680 acres. Leases within known geological structures will be limited to 2,560 acres. An over-all maximum of 128,000 acres may be held by one person, not more than 30,720 acres under producing leases, in any coastal region, of which three are set up. Leases will be awarded after competitive bidding, on the highest bonus.

Off-structure leases will be extendable for not more than 5 years upon proof that actual development work costing at least $75,000 has been done, and all leases developing production will be continued as long as oil is produced in paying quantities. The royalty rate will be not less than 12½ per cent.

Government Has Purchase Right

In event of emergency, the Government will have the right of first refusal to purchase all or any portion of the oil or gas produced from the submerged lands at the market price.

A submerged coastal lands commission would be set up to pass on exchanges of state for federal leases, applications for which must be filed within 6 months after enactment of the measure. Federal leases will be upon substantially the same terms as the state leases and will contain provisions to protect the interests of over-riding royalty holders and others concerned.

In passing on applications for lease exchange, the commission will consider the extent to which operations under the lease will facilitate or impede national defense; military and civilian requirements, both current and future, for oil and gas; immediate and long-range need for maximum exploration and development; whether the area was, at the time of lease execution, within a known geologic structure; whether, and to what extent, the investment in development of the lease area has been recovered by production under the lease; what, if any, profits have been realized from the old lease; the extent of development and the diligence of operations under the old lease and whether the old lease was, apart from the absence of title in the lessor, subject to cancellation, modification or reformation.

If the commission determines an exchange lease should not be granted, but believes that in fairness the applicant should receive a sum of money, it shall so report to the Secretary who, in turn, shall submit the report to Congress for consideration, and Congress would be the final judge and whether and how much compensation should be paid.

Neither the state nor operators under state leases would be held liable for any production prior to June 23, last, but the state will be required to account to the United States for rentals, royalties and other sums received after that date under its leases.

The 37½ per cent of the income going to the state will be from operations within the 3-mile limit only; 52½ per cent of income from the same area will go into the reclamation fund.

Rentals on exploratory leases would be 25 cents an acre annually for the fourth year and not less than 50 cents an acre thereafter. No rental will be required for the first 3 years.

In the making of leases no priority or preference will be given applicants who filed with the Interior Department under the Mineral Leasing Act prior to the Supreme Court decision.

Texas Commission to Study Higher MER's

AUSTIN.—The Texas Railroad Commission last week took the first step toward determining if the state's fields are capable of producing above present record-high levels without damaging the reservoirs.

The commission gave notice of a series of hearings during the first 3 weeks in April at which evidence will be taken on new maximum efficient rates of production for various fields. Hearings are scheduled in each of the commission's 10 districts.

With exception of East Texas field, all areas in Texas are now authorized to produce at existing MERs, which were determined in a series of similar hearings last year. Further increases in Texas crude-oil production, now about 2,385,000 bbl. daily, would come from revision of MERs.

In calling the hearings, the commission asked field operators to provide data on reservoir pressure, gas-oil ratio, per cent or barrels of water produced, and rate of oil production for each reservoir and field. The commission said this data is to reflect, where available, average reservoir values for each reservoir.

Preferably the information is to be furnished for periodic intervals during the producing life of the reservoir or at least for the immediately preceding 4 years. The commission suggested that operators in each field assemble their data and present it for the field as a whole. It asked that one operator be named to submit data on each reservoir as a whole but said each operator, however, should make his own recommendation as to the MER. Operators also were asked to give additional information such as average porosity, average permeability, type of drive, and productivity indices where available.

Hearings, by districts, will be as follows:

1. Southwest Texas, April 1.
2. Southwest Texas, April 2.
3. Gulf Coast, April 6.
4. Southwest Texas, April 8.
5. East Central Texas, April 13.
6. East Texas and East Texas (outside), April 13.
7. West Central Texas, April 14.
8. West Texas, April 15.
9. North Texas, April 22.
10. Panhandle, April 22.

Index Ready Now

The complete editorial index of The Oil and Gas Journal for 1947 is now ready and will be sent without charge to all subscribers requesting a copy. This 56-page index is bound separately and is more completely crossindexed than ever before. Address requests to Circulation Department, Box 1260, Tulsa.

this week

TRENDS—Crude production sets another all-time record with a daily average output of 5,369,105 bbl. daily during week ended February 7. . . . Figure represents increase of 25,905 bbl. daily over previous week and 18,600 bbl. daily over previous record set during week ended January 24. . . . Texas production shows gain of 47,125 bbl. daily. . . . ¶Runs to stills during week ended January 31 average 5,434,000 bbl. daily, slight drop from previous week. . . . ¶Well completions total 583 during week ended February 7, a drop from previous weekly total of 674. . . . Wildcat completions total 88, against 113 in previous week. . . .

INTERNATIONAL—Creole Petroleum Corp. becomes first Venezuelan oil company to sign agreement with oil workers union. . . . ¶Strike in Colombia brings oil-industry operations almost to standstill. . . . ¶Caltex, Socony-Vacuum announce creation of jointly owned Mediterranean Refining Co. . . . ¶Second test at Asl, south of Sudr field in Egypt, brought in as producer with 600-bbl. potential. . . . New well points to more important oil-producing role for Egypt. . . . ¶Immediate increase in European refining capacity pointed out as necessity to make Marshall plan work. . . .

LEGISLATION—Interior Secretary Krug sends proposal to Capitol for exchanging state for federal leases covering California offshore lands. . . . Bill would permit issuance of leases for exploration and development. . . . ¶New legislation to be submitted, Krug says, providing federal assistance to get huge synthetic fuel program under way. . . . Bill being drafted to provide for federal retention of synthetic rubber plants. . . .

INDUSTRY—Study of MERs planned in Texas to determine if production can be increased without damaging reservoirs. . . . ¶NPC Chairman Hallanan appoints regional committees to operate under voluntary agreement to combat fuel shortage. . . . ¶Hallanan also names group to study L.P.G. situation. . . .

GOVERNMENT—FPC deadlocked on proposed amendments to Natural Gas Act. . . . ¶State Department cuts estimates of oil requirements under European Recovery Plan, opens big guns in support of program. . . . ¶House committee calls for cut in oil-burning equipment manufacture, increase in steel allocations for production and refining divisions. . . . ¶Export of pipe questioned by State Department's Thorp before armed services committee, marking departure from past official statements.

REFINING—Phillips Petroleum Co. awards contract for expansion program in Kansas City, Kans., refinery. . . . ¶Illinois Farm Supply Co., cooperative, buys Pana Refining Co., which operates 4,000-bbl. refinery at Pana, Ill.

A new plant is rapidly nearing completion in the area which was worst hit in the Texas City explosion April 16, 1947. It is Monsanto Chemical Co.'s styrene plant, scheduled to go into operation next month. Monsanto, whose old 50,000-ton annual capacity plant was almost completely demolished, began rebuilding shortly after the disaster

Foreign Aid Estimates Cut; State Department Presses for Approval

by Bertram F. Linz

WASHINGTON.—The State Department last week unlimbered its largest guns in support of its European Recovery Program, assigning to Lewis Douglas, Ambassador to Great Britain and former member of Congress, the task of presenting new and sharply revised estimates of Europe's oil needs to the House committee on interstate and foreign commerce.

So important did the department appear to consider that committee's acceptance of the plan that it released to it a commodity report on oil which was held back when similar reports on other commodities were made public last month.

That report, and Douglas' testimony, bore down heavily on the fact that the original estimates of the Committee for European Economic Cooperation have been cut by 21.9 per cent and that, instead of the 300,000,000 metric tons which the CEEC figured would be necessary during the 51 months of the aid program only 227,000,000 tons is now contemplated. Significance also was attached to the effort of the department to cut heaviest where it would do us the most good, as, for instance, in the case of fuel oil requirements, which it slashed by 45,000,000 tons, or approximately 30 per cent. (A metric ton is equal to about 7.5 bbl.)

Flanked by Paul H. Nitze, deputy director of the Office of International Trade Policy; Robert H. S. Eakens, acting chief of the petroleum division, and Walter J. Levy, economic adviser for petroleum in the Office of International Fuel Intelligence, Douglas enlarged upon the report and answered questions for 2 hours.

The whole oil program, he emphasized, is based on the assumption that Middle East oil will be available in an uninterrupted and steadily increasing volume throughout the recovery period, and in the event of "unfortunate developments" which would interfere with that flow, he said, the whole calculation of European requirements would have to be reviewed.

World Shortage Recognized

The department's latest revision took cognizance of the general world shortage of petroleum and the consequent fact that the large-scale coal-to-oil conversion program initiated in many European countries could not be carried out. It expressed the belief, however, that the quantities now set "should in general" be available, provided that the projects for the expansion of world production and refining, especially in the eastern hemisphere, are completed on schedule, and oil transportation and distribution capacity is increased commensurate with the scheduled rise of production.

"On a product by product basis it will still be difficult, especially in the case of heavy oil," it was explained. "However, any cuts that must be applied to bring consumption into line with requirements, if distributed equitably on a world-wide basis; would not seriously reduce the quantities available for Europe below the levels estimated by the executive branch. European total requirements comprise only 12 to 14 per cent of the total world oil demand."

The department estimated that by 1951 Europe, which in 1946 got only 23 per cent of its imports from the Middle East, will be getting 80 per cent from that area, releasing western hemisphere oil for the United States, which by then "will probably be the largest oil importing country of the world, importing for its domestic needs nearly as much as the three largest European oil importing countries—the United Kingdom, France, and Italy combined." By 1951, too, United States exports to the European-aid countries will drop to 4 per cent of their import requirements, or about 15,000,000 bbl. as against 77,000,000 in 1938 and 35,000,000 this year.

Needs of Foreign Countries

For the 4-year period beginning next July 1, it is estimated the participating countries will need 94,500,000 tons of crude and products from dollar sources, with a value, at July 1, 1947, prices, of $1,900,000,000, and 118,300,000 tons from non-dollar sources, with a value of $2,300,000,000. The original CEEC estimates called for 118,700,000 tons of dollar oil, valued at $2,500,000,000, and 154,900,000 tons from non-dollar sources, valued at $2,900,000,000.

The term "dollar oil," it was explained, refers to oil marketed by American companies regardless of where it might be produced, and not to oil supplied by American companies from the United States, which will account for about 25 per cent of the dollar-oil requirements in fiscal 1949 and only 8 per cent by fiscal 1952.

During the first 15 months of the program—April 1, next, to June 30, 1949—it is estimated 27,100,000 tons of dollar oil will be required. The July 1, 1947, price for this would have been $599,000,000, but the De-

TABLE 1—PRODUCT REQUIREMENTS OF THE PARTICIPATING COUNTRIES AND THEIR DEPENDENT OVERSEAS TERRITORIES, 1949-1952

(In thousands of metric tons)

	Dollar sources		Non-dol. sources		Total	
	U.S.	CEEC	U.S.	CEEC	U.S.	CEEC
Crude	38,823	42,724	33,137	39,398	71,960	82,122
Aviation gasoline	1,581	2,145	1,639	2,371	3,220	4,516
Motor gasoline	13,809	15,702	20,080	22,235	33,889	37,937
White spirit	245	237	343	371	588	608
Kerosine	4,906	6,140	4,971	5,760	9,877	11,900
Gas and diesel oil	9,603	14,184	17,067	21,042	26,670	35,226
Fuel oils	21,750	33,085	39,820	61,981	61,570	95,066
Lubricants	2,739	3,011	671	755	3,410	3,766
Asphalt	576	700	536	892	1,112	1,592
Wax	265	501	66	78	331	579
Coke	228	268	...	11	228	279
Total	94,525	118,697	118,330	154,894	212,855	273,591

TABLE 2—VALUE OF REQUIREMENTS OF THE PARTICIPATING COUNTRIES AND THEIR DEPENDENT OVERSEAS TERRITORIES, 1949-1952

(In $1,000, based on prices f.o.b. Gulf July 1, 1947)

	Dollar sources		Non-dol. sources		Total	
	U.S.	CEEC	U.S.	CEEC	U.S.	CEEC
Austria	3,918	.....	6,988	7,280	10,906	7,280
Belgium	90,588	115,933	49,457	65,203	140,045	181,136
Denmark	74,074	126,460	40,990	68,693	115,063	195,153
France	326,904	388,496	178,531	315,474	505,435	703,970
Greece	28,899	34,406	45,486	51,048	74,385	85,454
Iceland	5,628	6,516	6,112	7,144	11,740	13,660
Ireland	42,514	54,848	26,535	42,167	69,049	97,015
Italy	191,428	243,784	132,450	147,147	323,878	390,931
Luxembourg	4,875	5,905	1,779	1,933	6,654	7,838
Netherlands	95,666	112,917	93,345	111,966	189,011	224,883
Norway	45,714	57,625	46,297	57,340	92,011	114,965
Portugal	27,565	40,461	18,107	26,914	45,672	67,375
Sweden	137,844	222,861	51,086	66,103	188,930	288,964
Switzerland	30,879	45,051	41,423	64,297	72,302	109,348
Turkey	26,768	44,937	20,408	34,366	47,176	79,303
United Kingdom	489,437	538,632	1,183,420	1,413,256	1,672,857	1,951,888
Western Germany	118,359	147,753	52,250	63,126	170,609	210,879
Territories	206,031	274,202	298,853	402,450	504,884	676,712

cember 31, 1947, price would be $762,000,000, and the actual price today would make it cost still more.

To provide the amount of petroleum equipment necessary for non-American companies of the participating countries operating both within and outside their borders, the CEEC report estimated that $1,300,000,000 of equipment must be obtained from indigenous production and about $583,000,000 from United States sources, while to transport the needed supplies to the various countries it estimated that $485,000,000 would be needed for the use of dollar tankers.

The department took issue with the CEEC on this subject, pointing out that the equipment figures made no provision for the needs of American companies operating in Europe, making it necessary for them to import and finance in dollars practically the full amount of their equipment requirements whereas non-American companies could utilize local exchange.

"This situation is inconsistent with United States policy, which seeks nondiscriminatory treatment for its nationals abroad," it declared. "Under this principle, there should be no discrimination for or against United States companies either as to allocation of equipment manufactured within participating countries or with respect to the making available of import licenses or of foreign exchange. On the basis of complete equality of treatment of American subsidiaries in participating countries, the dollar requirements of these countries should be increased to cover the needs of the American subsidiaries. This increase might well be more than 50 per cent of the original dollar request."

Commenting on the projected transition of the European oil economy from western hemisphere to eastern hemisphere oil, Douglas said "it is as clear as crystal and as crisp as bacon that an extraordinary shift in sources of supplies will take place in the course of the next 4 years. Its effect will be to relieve the western hemisphere of a burden it has previously been carrying and increase reserves available for the United States."

The present estimates of the requirements of the 4-year period by products and by countries, as compared with the CEEC projections, are shown in the accompanying tables.

Government Synthetic-Fuel Plan Will Aid Industry, Krug Insists

WASHINGTON. — An immediate start on a nine billion dollar synthetic fuel industry which will require sixteen million tons of steel was asked of the House public lands committee February 9 by Secretary of the Interior J. A. Krug.

Krug, who said he would shortly submit definite legislative proposals to get the program under way, made it clear that he did not visualize a Government oil industry but, rather, Government assistance to private industry in getting synthetic production quicker than it would normally develop.

"Because of the growing unbalance between demand and supply," he told the committee, "the United States cannot rely exclusively on petroleum to supply all future requirements for liquid fuels and related products.

"It is my own conviction that the magnitude of a synthetic fuels industry adequate to compensate for the foreseeable deficiency in domestic petroleum requires that a start be made immediately. The establishment of such an industry would be far too large an operation and would require too much time to be undertaken only after a national emergency had arisen."

Explaining that he contemplated three plants, one for oil shale and the others for coal, Krug said they should be in operation before we go ahead to provide for capacity needs. "Unless you construct these plants now there wouldn't be any chance of getting 2,000,000 bbl. a day capacity in 10 years," he said. That period will be required to get the plants up and working.

Location of the plants is a matter of major economic importance, he admitted under questioning, and the Army Engineers now are making studies of all factors going into location, and a special National Petroleum Council committee is going into the matter in connection with its complete study of synthetics.

House Passes Bill

A few hours later the House passed legislation extending the Bureau of Mines research program for an additional 3 years and providing $30,000,000 more for the work, with an amendment earmarking $1,000,000 of the fund for a program of production research and secondary recovery from stripper fields and in refining processes.

The amendment was offered by Leon H. Gavin of Pennsylvania, supported by Congressman Ed Gossett of Texas and others who had been "briefed" on the subject by independent operators.

Debate on the measure was marked by the emphasis placed on the uncertainty of supplies from the Middle East and the urgency of the domestic situation, and members of the public lands committee prepared the House for reception in the near future of Krug's proposal for large-scale synthetic production.

Lincoln Expert Finds No Link With Petroleum

SIGNIFICANT events in the life of Abraham Lincoln coincided closely with the early development of the oil industry but he appears to have been unaware of the potential importance of petroleum, according to James A. Veasey, Tulsa, former general counsel of Carter Oil Co.

A student of the life of the Civil War president and also of the oil industry, Veasey marked Lincoln's birthday this week with a report on his attempt to find a connection between the two.

Veasey pointed out that in 1854 Lincoln was making his first compaign for the Senate while Drake was buying the land on which he drilled the world's first oil well. In August 1858, Lincoln and Douglas were holding their historic debates when Drake concluded he could not dig for oil by hand but must procure drilling equipment. A year later, when the success of the Drake well was receiving prominent discussion in every newspaper in the country, Lincoln made his famous Cooper Union speech which is credited with winning him the presidential nomination.

In spite of the nation's excitement over the Drake well, Lincoln made no reference to oil in lectures on "Discoveries and Inventions" he delivered in 1860, though in 1862 he approved war taxes on petroleum.

For all his research, Veasey could find but one Lincoln reference to oil, and that was in a humorous vein. As Veasey relates the incident:

"From the very beginning there existed in the oil regions the expression 'struck ile.' In February 1865, 2 months before the President's assassination, Bishop Simpson of the Methodist Church delivered an address in Washington recounting the inventions and discoveries which had contributed to the success of the National cause. He did not mention petroleum. The President and Mrs. Lincoln were in the audience. Lincoln, in congratulating the eloquent Bishop on his address, quaintly remarked that at no time had the churchman 'struck ile.'"

International

WORLD-WIDE OIL DEVELOPMENTS

Drop in Over-All German Output Overshadows New Emsland Record

PRODUCTION of crude oil in Germany in October totaled 50,697 tons (about 365,000 bbl.), a drop of 1,300 tons (about 9,400 bbl.) from the September production figures.

Irregularity of electric current supply contributed to the drop in output, particularly in Nienhagen and Wesendorf fields.

Production in Emlichheim field in the Emsland, most promising of the German fields, reached another production record with an output of 5,780 tons (nearly 42,000 bbl.) Output in Emlichheim, however, still was hampered by shortages of both labor and equipment. Liners, necessitated by peculiar sand conditions in the field, have not been obtainable in sufficient quantity. Also, accommodations for workers are insufficient.

Drilling footage during October remained about the same as in September, showing a gain in drilling in proven fields and a corresponding drop in the drilling of extension wells. Footage drilled during October was about 37,326 ft., against about 39,340 ft. in September.

A new and considerable extension to Wesendorf field was proved by Deutsche Erdol A.G. with completion of its well to the south of the field. Production was obtained at about 3,300 ft.

Creating much discussion within the German oil industry was the announced plan of the North German Oil Control to greatly restrict or entirely halt the drilling of development wells in the smaller oil fields in order to release equipment for the development of the more promising Emsland oil deposits.

Most German companies feel that work in the small fields should continue, using locally available equipment. They point out that the equipment, for the most part is unsuited to use in the Emsland area.

If an order halting such local drilling were carried out, it would affect Broistedt, Calberlah, Etzel, and Hambuhren fields, as well as parts of Heide. There still remain five or six areas at Calberlah where oil might be expected to be found in commercial quantities. Small production is expected in wells as shallow as 400 ft., which would require relatively small amounts of equipment. Similar conditions may be found also in other areas.

At present, the most pressing shortage in Emsland is that of labor, due largely to the lack of housing facilities. However, the North German Oil Control has pledged support of a move to obtain the release for this purpose of the Bathorn camp, which has been used to house displaced persons.

GERMAN OIL PRODUCTION IN OCTOBER (TONS*)

Schleswig-Holstein-Hamburg:		
Heide	4,956	
Reitbrook	3,003	
Meckelfeld	174	8,133
Hanover:		
Etzel	368	
Steimbke	3,351	
Hademstorf	431	
Thoeren	1,478	
Wietze	1,871	
Fuhrberg	3,687	
Nienhagen	10,455	
Eicklingen	1,136	
Wesendorf	3,935	
Eddesse	246	
Oberg	491	
Moelme	417	
Broistedt	291	
Hohenassel	1,604	
Others (Calberlah, Gifhorn, Ehra)	222	29,983
Emsland:		
Emlichheim	5,780	
Georgsdorf	2,903	
Lingen	3,307	11,990
Total northwest German production		50,106
Baden		591
Total German production in October		50,697

*A metric ton is equivalent to about 7.2 bbl.

Second Egyptian Test Brought in as Producer

ADDITIONAL evidence that Egypt may play a more important role in the production of crude oil in the Middle East area is seen with the successful completion of the second test at Asl on the Sinai Peninsula which has been brought in as an oil producer. On a 1¼-in. choke, a flow test showed a potential of 600 bbl. daily, with a specific gravity of 0.922 (22° A.P.I. gravity).

Asl is located about 10 miles south of Sudr field, where 1947 completions of six oil wells showed a daily potential of about 5,000 bbl. In Asl, as in Sudr, the operation is being carried on jointly by Anglo-Egyptian Oilfields, Ltd. (Royal Dutch-Shell) and Socony-Vacuum Oil Co., Inc.

The Sudr wells are located in the Miocene and Eocene limestone formations. The Asl discovery well was drilled to 3,872 ft. in Eocene limestone. Company geologists believe that the Sudr and Asl fields are on different structures. The first Asl test was drilled to around 4,000 ft. and temporarily suspended. The second test was in the same general area. Pending construction of a pipe line, the Asl well has been shut in.

Oil from Sudr field is being taken out by a 3-mile 4-in pipe line to the Gulf of Suez and then transported by water to Anglo-Egyptian's Suez refinery, which is now running at approximately 35,000 bbl. daily.

Company expectations are that the one rotary rig at Asl will be supplemented by additional rigs in order to define this area.

British Independents Given Refinery Permit

A license has been granted to a group of independents to construct an oil refinery at Tynemouth, Northumberland, England, according to reports. The capacity of the plant has not yet been disclosed, nor has work actually begun on the construction. Moore & Barrett, petroleum technologists, are consulting engineers for the company, which reportedly is backed by Trent Oil Products Development, Ltd., and Harold Moore.

Strike Halts Operations In Colombia

OIL industry production and pipe line operations in Colombia are practically at a standstill due to labor difficulties, according to reports from South America and New York offices of the companies concerned.

The strike reportedly started when Tropical Oil Co., Colombian affiliate of Standard Oil Co. (N.J.) found it necessary to lay off several employes at the De Mares concession The labor union held that this was unnecessary.

Latest reports indicate that the strike has spread to the Barco concession of Colombian Petroleum Co., jointly operated by The Texas Co. and Socony-Vacuum Oil Co., Inc., as well as to operations of South American Gulf Oil Co. and Andian National Corp., Ltd. Andian National's pipe line transports crude oil from Tropical's De Mares concession and the Casabe concession of Cia. De Petroleo Shell de Colombia.

An official of Colombian Petroleum explained the shutdown on its operations started February 5, and a few days later all but the most essential facilities (hospitals and kitchens) were at a standstill.

Refinery operations presumably will continue, for a short time at least, working on stocks in storage.

The Colombian Petroleum strike, while involving labor difficulties, is a bit different from the Tropical strike in that the dispute reportedly is the result of certain union demands over a guarantee of stability of employment. But the net result is the same. The Tropical strike started early in January.

A Reuters dispatch from Bogota states that 46 people were injured in a clash between Tropical strikers and police who where trying to safeguard nonstriking workers. The police were acting on behalf of the Colombian undersecretary of petrol.

Caltex, Socony-Vacuum Form Refining Company

While the location of a plant, somewhere in the Mediterranean Sea area, remains unsettled, Socony-Vacuum Oil Co., Inc., and California-Texas Oil Co., Ltd., have formed a jointly owned company known as the Mediterranean Refining Co.

M. H. Lipp is president; Dana S. Mellett is vice president in charge of operations; and Norman H. Jackson is vice president in charge of finances. These men are on the board of directors, as well as Charles L. Harding, H. B. Nichols, F. E. Powell, Jr., and Blake Middleton.

Creole Signs Oil Workers Federation Agreement

Creole Petroleum Corp. is the first Venezuelan oil company to sign a new collective agreement with the Oil Workers Federation. The contract reportedly includes increased housing allowances, salary increases and additional medical attention for more members of a worker's family.

This contract was signed after the federation expelled communists from its leadership for their unwillingness to accept the terms. A majority of the federation's leadership accused the communists of waiting to foment a national oil strike as to "comply with foreign slogans and to support at any cost the (oil) strike in Colombia."

The new Creole agreement is for a 3-year period and contains a clause whereby negotiations may be opened after 2 years, by either party, to discuss salaries. Similar contracts are expected to be signed shortly with Caribbean Petroleum Co. (Shell) and Mene Grande Oil Co. (Gulf).

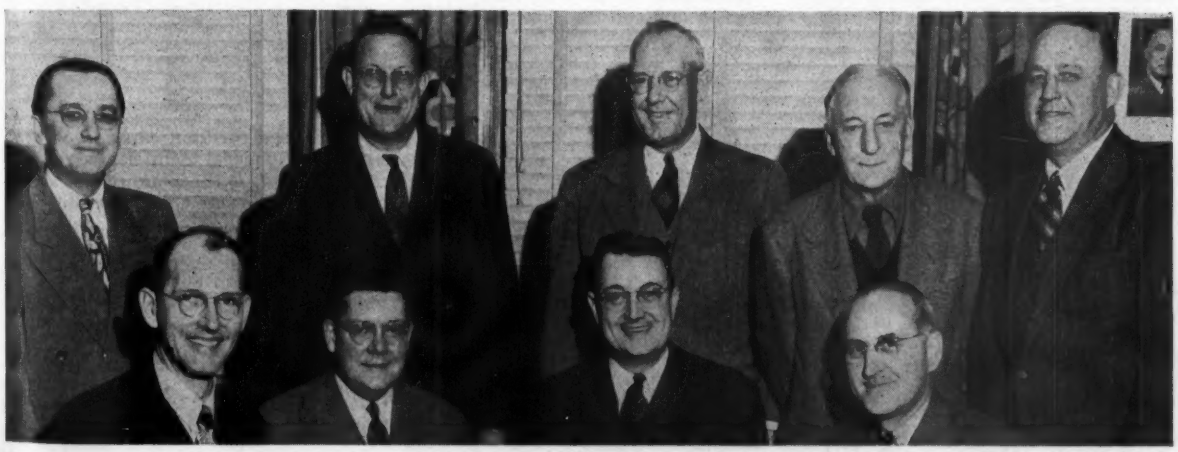
International

Iranian Crude Output Shows Gain During 1947

Total Iranian crude-oil production for 1947 increased to 20,000,000 tons (410,955 bbl. daily), compared with the 1946 production of 19,200,000 tons (394,525 bbl. daily), according to 1947 provisional figures released this week by B. R. Jackson, Anglo-Iranian's United States representative.

The company's November production in Iran was 1,633,000 tons (415,748 bbl. daily) compared with 1,689,000 tons (422,250 bbl. daily) for November 1946. Iranian production from January 1 through November 30, 1947, reached 18,292,000 tons (410,745 bbl. daily) compared with 17.505,000 tons (393,075 bbl. daily) for the same period in 1946.

Anglo-Iranian's production in the United Kingdom last year—according to provisional figures—dropped to 47,000 tons (960 bbl. daily) compared with 55,387 tons (1,140 bbl. daily) in 1946.



New officers of the Tulsa chapter of Nomads are shown here following their installation February 2. Left to right, front row, are J. Murray Walker, Lane-Wells Co., treasurer; John Pearce, manufacturers representative, secretary; K. O. Hoevel, National Supply Co., vice president; and M. D. Gilbert, Rockwell Manufacturing Co., president. Back row: Oscar B. Irizarry, editor of Petroleo Interamericano, assistant secretary; B. E. Groenewold, Bethlehem Supply Co., sergeant-at-arms; Neal Harris, Continental Supply Co., assistant sergeant-at-arms; H. M. Cosgrove, Purchasing Agents Association of Tulsa, executive secretary of the national board of regents; and Henry Bourne, Republic Steel Co., regent. Not shown are Stanley Wilcox, Seismograph Service Corp., regent, and H. J. Wodslayer, Lee C. Moore Co., assistant treasurer

Immediate Increase in European Refining Capacity Needed to Make E.R.P. Work

by Warren W. Burns

International

IF the over-all aspects of the European Recovery Program (Marshall Plan) are to be realized, European refinery construction, expansion, and rehabilitation must get under way as soon as possible this year or an effective system of rationing petroleum products will be necessary in the United States.

This statement, made to The Oil and Gas Journal by a high-ranking oil company official, is based on the assumption that the United States will see the Marshall Plan through. In elaborating upon this observation, it was pointed out that large quantities of steel for export obviously will be necessary and that "it makes sense to use the limited amount obtainable in the United States and throughout the world for the maximum petroleum return."

Exactly what developments will unfold in the Middle East drama remains to be seen, but with the strong backing which high-ranking United States military and civilian officials are willing to give to protect the oil interests there, it appears certain that the source is assured and that Europe will obtain the necessary crude oil from that area.

Because of the increasing United States demand for all types of petroleum and petroleum products, there is a growing insistence that Europe and the entire Eastern Hemisphere be independent of the Western Hemisphere for its supplies. Such a condition would relieve the United States' situation in that supplies now going to the Eastern Hemisphere would be routed to the states.

Increased Middle East Imports

Until this situation is realized, however, it becomes increasingly apparent that Middle East crude oil imports to the United States will be stepped up. At a press conference this past week, Chester F. Smith, a director and vice president of Standard Oil Co. (N.J.) stated that the company's East Coast refineries could use 15,000 bbl. more crude than it is now possible to get from domestic and Caribbean sources. From all indications this company, as well as Socony-Vacuum Oil Co., Inc., will be importing substantial amounts before summer. By May, Socony-Vacuum hopes to be bringing into the United States approximately 15,000 bbl. a day of Middle East crude oil. And with the tanker situation easing somewhat it appears that the current premiums of from 100 to 300 per cent above U. S. Maritime Commission rates will be history.

According to present refinery expansion and construction plans, about 20 plants are being contemplated, with an estimated daily throughput of 590,000 bbl., for the 16 Marshall countries and the Bizonal area in Germany. The operating capacity in Europe alone, for 1951, is expected to be 390,000 bbl. daily above 1947. The Oil and Gas Journal, in its annual international issue, December 27, 1947, estimated that 900,000 bbl. of refining capacity will be added in areas outside the United States over the next 3 years.

In the report of the National Petroleum Council's committee on Analyzation of the report of 16 (Marshall Plan) nations, of which A. Jacobsen, president of Amerada Petroleum Corp., is chairman, it was pointed out that as new European refining capacity is installed, it is anticipated that crude oil will be obtained principally from the Middle East and that shipments from the Gulf of Mexico and Caribbean will decline to a nominal amount.

Refinery operations for the 16 Marshall Plan countries, as projected in the NPC report, may be found in Table 1.

TABLE 1—PROJECTED REFINERY OPERATIONS FOR MARSHALL PLAN COUNTRIES

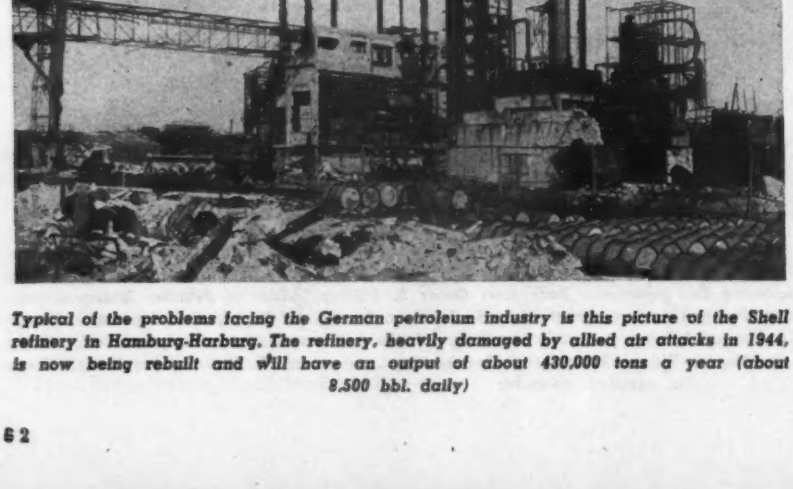
	Crude imports (1,000 bbl. dly.)	Per cent From dollar sources	Per cent Over 1938	Per cent Over 1947
1938	249	47	..	..
1946	125	36	—50	..
1947	217	49	—13	..
1948	270	54	8	25
1949	347	51	39	60
1950	459	47	84	112
1951	602	55	141	178

Increased refining capacity is projected for several countries but nearly 75 per cent of the planned expansion is in France and Great Britain. This is illustrated by Table 2.

TABLE 2—INDICATED REFINERY RUNS (1,000 Bbl. Daily)
(Includes indigenous crude and synthetics)

	1938	1947	1951
France	146	108	269
Great Britain	58	60	188
Italy	31	36	53
Netherlands	8	16	39
Sweden	2	12	39
Others	47	20	63
Total	292	252	651

Note: These estimates include American-owned companies which, except for France and Bi-Zone, are not included in equipment requirement estimates as explained later. "Dollar oil" is defined as oil purchased from American companies regardless of its origin.



Typical of the problems facing the German petroleum industry is this picture of the Shell refinery in Hamburg-Harburg. The refinery, heavily damaged by allied air attacks in 1944, is now being rebuilt and will have an output of about 430,000 tons a year (about 8,500 bbl. daily)

TABLE 3—REQUIREMENTS OF C.E.E.C. COUNTRIES
(Thousands of barrels daily)

	1938	1947	1948	1949	1950	1951
Refined product requirements	696	875	1,067	1,186	1,295	1,374
Output from local refineries	281	244	321	384	484	626
Product to be imported	415	631	746	802	811	748

It is anticipated that requirements of the so-called C.E.E.C. (Committee of European Economic Cooperation) countries and Western Germany will be met as shown in Table 3.

Increased Products Imports

With the expected increase in refinery capacity it would, of course, be necessary to increase product imports each year until 1951. The increased refinery runs in 1948 and 1949 are expected to result from rehabilitation of damaged plants and improvement in existing facilities. By 1950 and 1951, however, the estimates envision completion of several new refineries, principally in the United Kingdom, France, Netherlands, and Sweden.

TABLE 4—DEMAND BY PRODUCTS OF C.E.E.C. COUNTRIES
(1,000 Bbl. Daily)

	Motor fuels and naphthas	Middle* distillates	Residual fuel oil	Total, incl. other products
1938	328	158	147	696
1946	243	205	189	680
1947	273	250	293	875
1948	320	261	420	†1,067
1949	329	287	495	1,186
1950	348	309	558	1,295
1951	368	317	606	1,374
% inc.:				
1947 vs. 1938	—17	+58	+100	—2
1948 vs. 1947	+17	+4	+43	†+22
1951 vs. 1947	+35	+27	+107	+57

*Kerosine, gas and diesel oils. †Includes stock buildup of approximately 50,000 bbl. daily, or 6 per cent of 1947 requirements.

Classification of the above product demand for the C.E.E.C. countries and Western Germany, into three major divisions, is shown in Table 4.

Gasoline requirements show only a nominal increase over prewar. They were based on a continuation of the gasoline rationing programs instituted in 1947 before the "austerity" programs of the United Kingdom and France, and it was assumed that motor vehicle registration would increase about 2.2 per cent per year. The 1951 automotive gasoline requirements are estimated to exceed 1938 by only 5 per cent.

The marked upward trend in middle distillate demand, since 1938, reflects increase use of tractors and diesel burning equipment. The greatest of the C.E.E.C. requirement increases, however, is in residual fuel oil. Although ships' bunkers show a fairly rapid rise as would be expected from the preponderance of oil-burning vessels built during the war, it is in the inland trade where the really phenomenal increases take place, the report points out. In this connection, Dr. Courtney Brown, head of the petroleum-economics division, Standard Oil Co. (N.J.), points out that after 1951, the use of residual fuel oil may be confined largely to ships' bunkers. For by then, or a few years later, it is believed that refinery techniques will be so perfected that there will be relatively little residual produced.

With refinery activities in Europe playing a dominant role in the Marshall plan, as well as in the normal world supply of petroleum products, there has been some talk about the desirability of erecting a refinery, or refineries, on the island of Cyprus, located at the western end of the Mediterranean Sea. While this might not be the most economic location of such a refinery, or refineries, it is pointed out that from a security standpoint, it might be wise. Cyprus is about 150 miles from mainland of Palestine, Syria, and Lebanon, and thus within easy transportation distance from terminals of the Kirkuk-Haifa-Tripoli pipe line. And with Sidon, Lebanon, as the projected Mediterranean terminal of the Trans-Arabian Pipe Line Co., the possibility of refinery construction on Cyprus reportedly is being carefully studied.

TABLE 5—PUBLICLY ANNOUNCED PLANNED REFINERY CONSTRUCTION (NPC REPORT)

Country—	No. of plants	Capacity (bbl. daily)	Remarks
Western Hemisphere:			
Argentina	2	45,000	
Bolivia	2	5,000	
Brazil	2	12,500	
Brazil	1	1,500	Extension
Canada	2	12,700	
Canada	1	15,000	Extension
Chile	1	10,000	
Colombia	1	5,000	Extension
Ecuador	1	1,200	Extension
Mexico	1	30,000	
Uruguay	1	6,300	Extension
Venezuela	5	180,000	
Total Western Hemisphere		324,200	
Marshall countries:			
Belgium	1	3,000	
France	(?)	130,000	Rehabilitation & modernization
Germany	(?)	35,000	Rehabilitation
Great Britain	7	340,000	
Italy	1	4,200	
Italy	3	39,000	Extension & rehabilitation
Netherlands	1	20,000	
Netherlands	1	45,000	Extension
Portugal	1	5,000	Extension
Sweden	3	29,000	
Sweden	1	1,000	Extension
Total Marshall countries		651,200	
Eastern Hemisphere excluding Marshall countries:			
Australia	2	4,000	
British Borneo	1	20,000	Rehabilitation
Burma	1	15,000	
Canary Island	1	2,500	Extension
Egypt	1	10,000	Extension
Formosa	1	11,000	Extension
Java-Sumatra-Dutch Borneo	(?)	100,000	Rehabilitation & extension
Kuwait		20,000	
Iraq	1	12,000	
Palestine	1	60,000	Extension
Spain	1	10,000	
Syria	1	20,000	
Trieste	1	4,000	Rehabilitation
Total Eastern Hemisphere excluding Marshall countries		288,500	
Total Eastern Hemisphere		939,700	
Total World excluding U. S.		1,263,900	

Drilling Operations to Be Expanded in Philippines

Drilling operations of the Far East Oil Development Co., Inc., in the Philippines, reportedly are to be extended to the Bendoc Peninsula (Tayabas or Quezon Province) in southern Luzon. Meanwhile, drilling at the Daonbantayan lease on the island of Cebu is to be resumed.

While oil shows on Cebu have been found at 1,600 ft. and 8,200 ft., the commercial possibilities remain to be determined.

Plans are also said to be under way to resume drilling on the company's southern Luzon lease.

Far East Oil Development Co. is controlled by Andres Soriano, who acquired a concession some years ago from the Commonwealth Government to explore for oil on Cebu.

Oil Hearings Touch on Pipe Exports, Synthetics, Tidelands

WASHINGTON.—The first publicly expressed doubt of Government officials as to the wisdom of permitting the export of 480,000 tons of pipe for the Saudi Arabia pipe line was voiced last week by Willard L. Thorp, assistant secretary of state.

Testifying before a House armed services subcommittee, Thorp recommended a reconsideration of the administration's policy on encouraging Middle East oil production and took the position that it would be "very stupid" to be inflexible about the policy of exporting steel to build the pipe line.

It was the first time that any official of the various departments which participated in the consideration of the export application failed staunchly to defend the action, but Thorp admitted that the security and stability of the Aramco lease is uncertain and, he said, "I think it is necessary to review our position regarding possible future export licenses."

Thorp told the subcommittee that it was the basic feeling that in the "world picture" it was exceedingly important to build the pipe line from the Middle East to the Mediterranean and the project should be given preference.

"Today I doubt the wisdom of that decision," he commented.

Also before the armed services group, Ralph K. Davies, president of American Independent Oil Co. and wartime Deputy Petroleum Administrator, joined other members of the industry in turning thumbs down on the Krug-Forrestal plan to plunge into synthetics production and urged quick development of the tidelands.

Congress Should Clarify Title

Davies told the subcommittee Congress should clarify title to the California underwater lands, but did not express any opinion as to whether the federal or state government should get them. Development is being held up by the dispute, he said.

On the other hand, E. DeGolyer declared that the great cost, and not uncertainty over ownership, had been the deterrent to rapid development of the tidelands.

DeGolyer brought the subcommittee up to date on the reserves situation, testifying that present reserves are insufficient to guarantee the country self-sufficiency in oil in the future.

He contended that the situation should be met by importing all the oil possible without damage to the domestic industry.

The principles of state regulation of production and the interstate oil compact were outlined to the subcommittee by Chairman Ernest O. Thompson of the Texas railroad commission, who said that no field in Texas is producing beyond its most efficient rate.

Thompson said that all demands for Texas oil are being met, with the state currently producing 2,385,000 bbl. daily. He did not go into the matter, but in other quarters it was said that a restudy of the MER allowed some of the old fields years ago might permit an increase of as much as 100,000 bbl. daily without violating conservation principles.

The House interstate commerce committee, meanwhile, slogged ahead with its dragging investigation of the oil situation, past, present and future, after taking a couple of days out to work on radio legislation. Its principal witnesses during the week were State Department and Army-Navy Petroleum Board officials, with Col. G. H. Vogel, executive officer of the ANPB, disclosing that a total of 1,050,000 bbl. of fuel oil have been set aside by the Navy for relief use on the East Coast, despite the fact that the armed services do not have a working stock considered necessary to the present military situation.

During the course of its hearings, the committee was advised by Rep. John W. Heselton of Massachusetts that the Commerce Department has succeeded in getting the Canadian government to continue until the end of April the 50-per cent cut in imports of kerosine, gas oil and distillate fuel oil which it agreed to make for the month of January. Under that agreement, Canada will keep its imports of these products to not more than 50 per cent of the total during the same period last year. The action will result in limiting Canadian imports from the United States to not more than 1,320,000 bbl. during the first 4 months of this year, the department said.

Bill Asks Government To Retain Rubber Plants

WASHINGTON.—An armed services subcommittee last week recommended that the Government retain its war-built synthetic-rubber industry indefinitely, keep it in partial operation and require manufacturers of rubber products to use its output.

The subcommittee's decision will be embodied in legislation to be submitted to full committee February 17.

Under the proposed bill, which holds "there are no compelling reasons why the government-owned plants should be sold or leased to private interests," plants could be disposed of only on recommendation of the National Security Resources Board, confirmed by Congress.

The future disposition of the synthetic-rubber industry was the subject of lengthy hearings before a subcommittee headed by Rep. Paul W. Shafer of Michigan, at which Government officials and representatives of industry testified. The rubber industry itself was split on the question of disposing of the plants to private interests, but practically all witnesses agreed that no action should be taken which would eliminate synthetic-rubber production.

Legislation drafted following the hearings ordered that the synthetic product should be known as "American-made" rubber, but that term has been dropped.

Four Oil Companies Seek To Buy Pennsylvanian Line

OIL CITY, Pa.—Four Pennsylvania oil companies have offered to buy 4,500 shares of the capital stock of South West Pennsylvania Pipe Lines to protect their interest in the 412-mile system. They are South Penn Oil Co., Bradford; Pennzoil Co., Oil City, and Washington Oil Co. and Waverly Oil Works Co., Pittsburgh.

South Penn produces about one-quarter of the crude gathered by the system and the Waverly refinery depends on the line for much of its oil. Last fall Waverly purchased 7,960 shares of South West stock, about 23 per cent of the amount outstanding, from the Rockefeller Foundation, formerly the largest stockholder.

Mid-Continent Tax Forum Set For April

HOUSTON.—The Mid-Continent Oil and Gas Association's annual Federal Tax Forum has been scheduled for April 27-28 in the Blackstone Hotel, Fort Worth.

E. E. Hunter, Humble Oil & Refining Co., chairman of the forum, said the program will include a review of developments in federal tax matters of the last year and discussions of current problems. The forum is the meeting of the standing committee which is made up of taxation representatives of companies participating in the association.

VISCO

DEHYDRATING
•
DESALTING

VISCO PRODUCTS COMPANY, INC., Houston, Texas

NOTICE: Visco Products Company is authorized to manufacture and sell Visco Oil Treating compounds for use in the breaking and resolving of oil emulsions, and to grant licenses for such use, under the following United States patents: 1,860,562; 1,860,563; 1,912,330; 1,937,259; 2,050,639; 2,050,640; 2,206,589; 2,214,783; 2,214,784; 2,225,189; 2,303,414; 2,307,813; 2,318,034; 2,318,035; 2,321,056; 2,335,554. Re. 20,717 and patents pending. Any purchaser of Visco oil treating compounds is authorized to use the same in the treating, breaking and resolving of oil emulsions in accordance with the above patents. The royalty for such use is included in the purchase price. Visco Products Company is authorized to and is willing to grant licenses on a royalty basis, to all companies, and to others desiring to practice the patented subject matter, under any and all of the above patents, permitting the user to purchase the oil treating compounds at will from any vendor, and to prepare the compounds for use under the above patent or patents, at a royalty charge of 20 cents per gallon. Application for license should be made to **Visco Products Company**, Houston, Texas.

WASHINGTON WATCHING

BY BERTRAM F. LINZ

Oil Stockpiling Studied

WASHINGTON.—Eighteen months ago, when the Strategic and Critical Materials Stockpiling Act of 1946 was under consideration, military officials did not believe that oil could be stockpiled and that commodity was omitted from the act. Today, many of those same officials are seriously studying the possibilities of building up a backlog of crude or products against a sudden emergency.

With the aid of industry experts, the Army-Navy Petroleum Board is digging into the subject, weighing the relative value of crude and products, the possibility of storing the former in the ground, the cost of such a project and other relevant factors.

When the stockpiling act was going through the congressional mill, the concensus was that oil would not lend itself to the plan to build up military stocks because of such problems as storage and quality control. The latter, it was believed, would necessitate a periodic exchange of stored products for new stocks, a cumbersome procedure involving elements of uncertainty, such as price.

Today painfully aware that the United States couldn't fuel even a short war involving widespread naval and air operations, some of the objections voiced in 1946 have lost much of their force.

Military Not Discussing Subject

Although the military are not discussing the subject to any extent, the plan is to import oil from the Middle East from which we might be cut off in the event of war, and store it, either as crude or products.

It is recognized that aboveground storage of any significant volume would be tremendously expensive in terms of materials, such as steel, and the most economic method would be to put crude into natural storage underground.

The ideal would be to find a good big hole, in which is water under high pressure which would permit rapid recovery of the oil, but more likely it would be necessary to recharge the oil with gas before it is put underground in some reservoir which has no water drive.

The alternative would be large concrete or steel reservoirs, below ground for safety.

Large-scale storage of oil is a matter in which the United States has had no experience, but there have been suggestions that Russia may be stockpiling, it having been pointed out that the soviet is building planes in numbers beyond its believed capacity to produce fuel, and would not be doing so unless it felt it could maintain them in the air.

Tidelands Recruits Sought

SUPPORTERS of legislation to guarantee the title of the states to their tidelands are beating the woods to enlist additional strength in anticipation of the hearings which will open before the Senate judiciary committee February 23.

Already backed by interests in the coastal states, they are devoting their efforts to the inland areas with navigable rivers and lakes which, they warn, have been placed in jeopardy by the Supreme Court decision in the California case.

The argument is that responsibility of the federal Government for national defense clearly extends to all navigable waters, whether inland or otherwise, and, for that matter, extends to all the lands of the nation. The Supreme Court's new theory of control of natural resources could, therefore, be extended equally as far.

The Department of Justice made no claim as to inland waters in the California case, but there is nothing to prevent the United States in the future from making exactly the same claims as to inland waters and the lands and resources beneath them.

As a matter of fact, department officials discussing the matter with members of Congress, although speaking unofficially, have expressed the opinion that if the federal Government should find that the land lying under inland waters was necessary to the national defense, or to the conduct of the Government's negotiations with other nations, the paramount federal power might be asserted with the same force and effect as with respect to the California tidelands.

Therefore, it is argued, state officials and mining and other industries interested in inland river and lake lands should join the coastal states in fighting for the legislation.

Atoms Aid Oil

TO the general public atomic energy means a mysterious new source of power some day, but to many industries, among them the oil industry, it means entirely new techniques which will make for better and more uniform products.

A byproduct in the production of fissionable material, isotopes are regarded as the most valuable new research tool since the invention of the microscope, permitting man to "see," for instance, just how a catalyst works in an oil refinery.

So important does it consider isotopes that the Atomic Energy Commission recently told Congress that if the development of atomic energy had produced nothing else, its cost would undoubtedly have been balanced within a few years by gains in knowledge that are being made with isotopes.

More than 1,600 shipments of radioactive isotopes were made from Oak Ridge last year, for industrial, medical, chemical, and agricultural use.

Uses for isotopes in the oil industry are already well developed. They start with production, where radioactive material can be injected into an oil reservoir and traced as it moves around underground, helping in the delineation of the pool and the drawing of a pattern for the most efficient method of production.

In the refinery, where the molecules in oil are broken down and reformed in new patterns with the aid of catalysts, the isotopes may show how the catalysts work and pave the way for better gasolines and lubricating oils, tailored to meet the needs of engines which also have been improved through the use of radioactive atoms.

The isotopes, themselves, won't produce any better or additional gasoline, steel, or rubber, but they will help to "show" researchers how they may get more or better products. Best of all, the Government's work on atomic energy is making it possible for industry to get for a few dollars radioactive tools that would have cost millions before the war.

Bogota Blues

STATE Department officials are actively planning the agenda they will propose to the inter-American trade conference scheduled to open in Bogota late in March, but so far as can be learned no other American republic has definitely decided to participate in the meeting and there is a distinct possibility that it may not be held.

The conference originally was planned to be held early last month, but was postponed at the suggestion of some of the Latin American countries until after the Havana trade meeting.

The United States Government does not want a further postponement, but reports from some of the South American countries indicate some sentiment unfavorable to the meeting.

There is, reportedly, some resentment over the failure of the State

Department to advise the several governments that exports which customarily go to Latin America might be diverted to Europe under the Marshall plan, and they got the news through press dispatches. The department feels the Bogota meeting would be a good place for the South Americans to "sound off" about that, but admits they might prefer to show their displeasure by saying nothing.

Another possibility is that the Latin American countries might not want to discuss the modification of their petroleum laws to permit the entry of American companies and capital, which they know the United States delegation will seek. To say "no" to such a proposal might be embarrassing, but there is no indication that any of the countries which now have nationalistic laws are willing yet to change them and, except for Venezuela, Colombia, and Peru, all South America is closed territory.

The State Department is confident that the meeting will be held, and its officials should be in position to know, and is working out a proposed schedule for discussion, in which oil may not be mentioned by name but will be brought up during consideration of "critical and strategic materials."

Gas Gripes Grow

ANOTHER of those industry slugging matches that make life interesting is in the making and may be staged in a few days before the Federal Power Commission when it comes to grips with the application of Trans-Continental Gas Pipe Line Co. for an 1,800-mile pipe line to carry gas to the New York-Philadelphia-Baltimore area.

In one corner will be the pipeline companies; in the other the recently organized Fuels Research Council, which charges its opponent is putting up lusty opposition to any program to produce gasoline from natural gas.

Natural gas can be converted into high quality gasoline at two cents a gallon less than it can be refined from petroleum, according to the high-powered public relations organization which is working for the council, and there is enough gas available to permit production of 500,000 bbl. daily for the next 25 years.

"Despite government sponsorship and important industry support, this synthetic fuels program has already encountered determined, if subtle, opposition," according to this council spokesman. "The nation is being promised synthetic fuels from coal, oil shale, saw dust—even garbage. And although there is no technical reason why synthetic gasoline cannot be obtained from these materials, the fact is that even the coal hydrogenation process has hardly reached the pilot plant stage."

Taking the position that there may be more profit but less public necessity for piping gas to the East for use as boiler fuel, the council has indicated it may get in on the Power Commission proceedings, along with the railroads, coal producers, labor unions, and others who will oppose the Trans-Continental application.

Canadian Compromise

TERMINATION of the so-called Hyde Park agreement with Canada, entered into by President Roosevelt in the early days of the war, probably will be announced in a matter of weeks.

The agreement, regarding which little had been heard after the end of the war, came into prominence last month when Commerce Department officials told the Senate small business oil subcommittee that they had negotiated an agreement whereby Canada would temporarily cut its imports of United States oil products.

Later it became known that the agreement also was affecting steel supplies, and negotiations now are under way for its termination.

Under the arrangement with Canada, which, roughly, provided for the pooling of resources of the two countries for the war effort, State Department officials took the position that no interference could be offered to importation by Canada of such amounts of such United States products it might require.

Small business subcommittee chairman Kenneth S. Wherry of Nebraska and officials of the Commerce Department took the position there was nothing in the agreement which precluded restrictions on exports to Canada, and State Department representatives finally agreed, but reluctantly, that was true. Both departments, however, took the view that it was better for the relations between the two nations to curtail shipments by negotiation than by fiat.

Sun Will Buy Crude in Four Additional Fields

HOUSTON.—Sun Oil Co. issued a new crude-oil price bulletin effective February 1 adding four Southwest Texas fields—La Gloria in Jim Wells and Brooks counties, and Ross, Boyle, and Cameron in Starr County—to the areas in which it purchases.

Sun's prices are the same as those already prevailing in the fields.

Sun Pipe Line Co. is asking bids on a 7-mile, 4-in. extension from Tijerina Canales field to La Gloria. Sun reportedly will connect with 8 leases in La Gloria, taking about 2,150 bbl. daily. Sun also is making preparations to build an 8-mile, 4-in. line from its Garcia station to serve Boyle and Ross fields. A new loading terminal in the Corpus Christi area is reported scheduled for completion by March 1.

American Republics Corp. Forms Shipping Subsidiary

HOUSTON.—American Republics Corp. is reconstituting its marine shipping organization with the formation of a new subsidiary, Petroleum Navigation Corp.

A former subsidiary, Petroleum Navigation Co., was disbanded after its three tankers were lost during the war. Petroleum Navigation operated largely under charter and during the war was an agent for the War Shipping Administration.

Plans are under way for the acquisition of tankers for the organization. G. O. Irvine, vice president of American Republics, is president of Petroleum Navigation Corp. The new corporation was formed out of the already-incorporated Pennsylvania Shipyards, Inc., Beaumont, an American Republics subsidiary the assets of which were sold in December to Bethlehem Steel Co.

Phillips Asks Engineers For Copano Bay Permit

HOUSTON.—Phillips Petroleum Co., Gulf Coast division of the production department, has asked a blanket permit from the Army Engineers office in Galveston authorizing all construction necessary to oil development in Copano Bay, northwest of Rockport, Tex. Phillips' application involves 14 state tracts in the bay.

Three other oil companies have asked permits from the Engineers office for other type of work in Texas Gulf Coast navigable waterways. Sinclair Refining Co., pipe-line department, Independence, Kans., proposed an 8-in, pipe line under Mission River about 1 mile south of Refugio, Tex. Atlantic Pipe Line Co., Philadelphia, asked permission to build a steel wharf and to do dredging on the Neches River's right bank 6½ miles northeast of Port Arthur. Gulf Oil Corp. at Port Arthur asked authority to widen a concrete wharf southwest of Port Arthur, and Gulf at Houston, proposed to dredge a channel in Tabbs Bay abolut 1½ miles south of Baytown, Tex.

Louisiana Allowable Reaches New Record

Louisiana's daily production allowable for February has been set at 507,992 bbl., an increase of 3,922 bbl. over the previous month and again a new all-time high. Since June 1946 the allowable figure each month has consistently broken the previous month's record.

Oil-production allowable for Oklahoma has been set at 410,000 bbl. daily for February by the Oklahoma Corporation Commission. This is the same total as for December and January.

Texaco Now Licensing Process For Synthetic-Fuel Production

by Arch L. Foster

NEW YORK.—The Hydrocol process for making synthetic gasoline and other products from natural gas has been proved commercially in a pilot plant of The Texas Co. at Montebello, Calif., and is now being offered for general license, it has been announced by W. M. Stratford, president of Texaco Development Corp.

The process will be used in the commercial plant now under construction at Brownsville, Tex., for Carthage Hydrocol, Inc., in which The Texas Co. is the largest stockholder. Stanolind Oil & Gas Co. also has final plans ready for a similar plant to be built in the Hugoton gas field in southwestern Kansas.

The Montebello pilot plant is now making about 5,000 gal. of synthetic gasoline daily. The two commercial plants will produce about 7,000 bbl. daily each, in addition to other hydrocarbon chemicals.

In making these announcements Dr. W. E. Kuhn, manager of the technical and research division of The Texas Co., declared that the Hydrocol process is a vast improvement on the methods used by the Germans to make synthetic motor fuels during the war and is better than anything so far developed by the federal Government's research on the subject. Texaco officials termed "fantastic" the proposal of Secretary of the Interior Krug to spend $9,000,000,000 for construction of plants to make synthetic fuels from coal and shale by older processes, saying there is sufficient natural gas available in the United States to support 50 Hydrocol plants producing a total of 350,000 bbl. of gasoline per day.

© Bachrach

W. M. STRATFORD

W. E. KUHN

Stratford is president of Texaco Development Corp. He has been with The Texas Co. since 1919. Kuhn, manager of the technical and research department of The Texas Co., joined the company in 1929

This process is the result of 10 years of investigation and research by The Texas Co. and other collaborating groups, it was explained. The process starts with natural gas and by a three-step conversion method synthesizes light, medium, and a small percentage of heavy hydrocarbons and considerable amounts of so-called "oxygenated" chemical products, the last consisting largely of the higher alcohols, aldehydes, ketones and other organic products. Based originally on the Fischer-Tropsch synthesis announced in Germany in 1925, it has little resemblance to that earlier development, L. C. Kemp, Jr., Texas Co.'s director of research stated. First step is the conversion of the raw material, in this case natural gas hydrocarbons such as methane, into a mixture of carbon monoxide and hydrogen, in the optimum proportions of two molecules of hydrogen to one molecule of carbon monoxide. This mixture is called "synthesis gas." Combining these two gases chemically in the presence of a catalyst at elevated temperatures forms hydrocarbons identical with those found in petroleum, such as pentanes and hexanes, to produce motor fuel, diesel fuels, and heating oil, along with the chemical byproducts mentioned. The third step is essentially one of distillation to separate the various products formed by the second step.

The Texas Co.'s synthetic gasoline pilot plant at Montebello (10 miles east of Los Angeles) is producing 5,000 gal. of product per day—from natural gas composed essentially of 100 per cent CH_4

Work at Montebello Plant

Much of the Texaco work was carried out at the Montebello pilot plant. The American developments based on the earlier Fischer-Tropsch method have led to higher capacities, higher conversions, very cheap catalysts and important reduction in investment costs, Dr. Kuhn stated. Current estimates of the over-all cost for present-day American plants are that these will be only about one-third the costs of the German process if installed now. Under these conditions the cost of motor fuel would be four times as high by the German process as the cost of the same product from the plants now under construction.

The German process made gasoline of 0-20 octane number, it was stated. The American plants will produce motor fuels of 80 octane number, using inexpensive, finely divided iron catalyst which is used on the fluid catalyst principle. Of the total production of liquid materials, 80 to 85 per cent is 80 octane motor fuel, it was stated. Catalyst life is estimated to be of the order of 500 hours in service, but can be regenerated and replaced continuously. Catalyst cost for American operations is estimated to range from 5 to 10 cents per pound, as compared with up to $2.50 per pound for the German catalyst with cobalt base.

Total production of liquid hydrocarbons was estimated conservatively at about 350,000 bbl. per day, if all gas economically available is converted to these products by this process. The Texas Co. and others are studying the reduction of coal and also shale oil to hydrocarbons by synthetic methods, Kemp stated.

It was estimated that The Texas Co. has expended more than $1,000,000 in this research to date, and that new expenditures during 1948 will be of the order of magnitude. All the research on the processes has been backed and paid for by private capital and private initiative.

The Brownsville Hydrocol unit will process 289,000,000 cu. ft. of air to obtain 53,000,000 cu. ft. of concentrated oxygen gas, imperative for the partial combustion of natural gas to form synthesis gas. The unit is being designed by Hydrocarbon Research, Inc., and is being built by A. G. McKee & Co.

FPC Deadlocked Over Proposed Amendments to Natural-Gas Act

WASHINGTON.—A sharp division between the four present members of the Federal Power Commission on revision of the Natural Gas Act was aired last week at hearings before the Moore subcommittee of the Senate interstate commerce committee.

Chairman Nelson Lee Smith and Commissioner Harrington Wimberly favor clarification of the act, including the exemption of producers and gatherers who are not also pipe-line operators and allowance to the latter of a fair price for the gas they themselves produce, but Commissioners Claude L. Draper and Leland Olds are unalterably opposed to any modification of the law, so the commission's long-awaited report on its natural gas investigation, originally promised for last fall, still is held up because of the refusal of any member to break the deadlock by shifting his position.

Burton Behling, who served as director of the staff for the investigation and wrote the staff reports, which favor revision of the act, has been nominated as the fifth member of the commission and on confirmation will give Smith and Wimberly a majority.

Smith and Wimberly, while agreed that the act should be revised, do not accept the language of the Rizley-Moore bill, which was passed by the House last session and was the subject of the Senate committee hearings, and submitted their own recommendations.

The Smith-Wimberly proposals would exempt arm's-length sales of gas from regulation and transportation of gas between the well-head and the point of delivery into the interstate transmission line.

Charges Mark Hearing

With respect to the much-contested proposal to permit pipe lines the field price for the gas they produce themselves, the proposal would allow natural-gas companies, as operating expense, the actual prices paid for gas purchased at arm's length from nonaffiliates and nonsubsidiaries; the actual cost if purchased through affiliates or subsidiaries, and, for gas produced by the company or a subsidiary or affiliate, "the reasonable commodity value of such gas in the field or fields where produced for gas of comparable quality, volume and pressure, delivered under similar conditions."

Last week's hearings were marked by charges that the Rizley-Moore bill would cost the consumers an additional $56,000,000, but John Jirgal, Chicago accountant who made a survey for the Independent Natural Gas Association, declared that figure, compiled by the FPC bureau of accounts, included only $16,600,000 in actual increased cost and charged the remainder represents computed increases of profits to be realized on purchased gas and additional income taxes.

Actually, Jirgal reported, the increase in consumers' bills would average about 2 per cent and the maximum would be less than 10 per cent, and, he testified, it is "inconceivable" that added income taxes will be passed on to the consumer as contended by the bureau.

Witnesses who testified at length last year in opposition to the bill had another chance to register their protests. Mrs. Anne X. Alpern, Pittsburgh city solicitor, renewed her charge that the measure was designed by the "big" pipe line companies to mulct the public of billions of dollars.

Hallanan Names Regional Groups To Combat Fuel-Oil Shortage

WASHINGTON.—Chairman Walter S. Hallanan of the National Petroleum Council last week named the regional committees to operate under the voluntary agreement approved by the Attorney General last month, with a general assignment to work for the maximum possible alleviation of the fuel oil shortage.

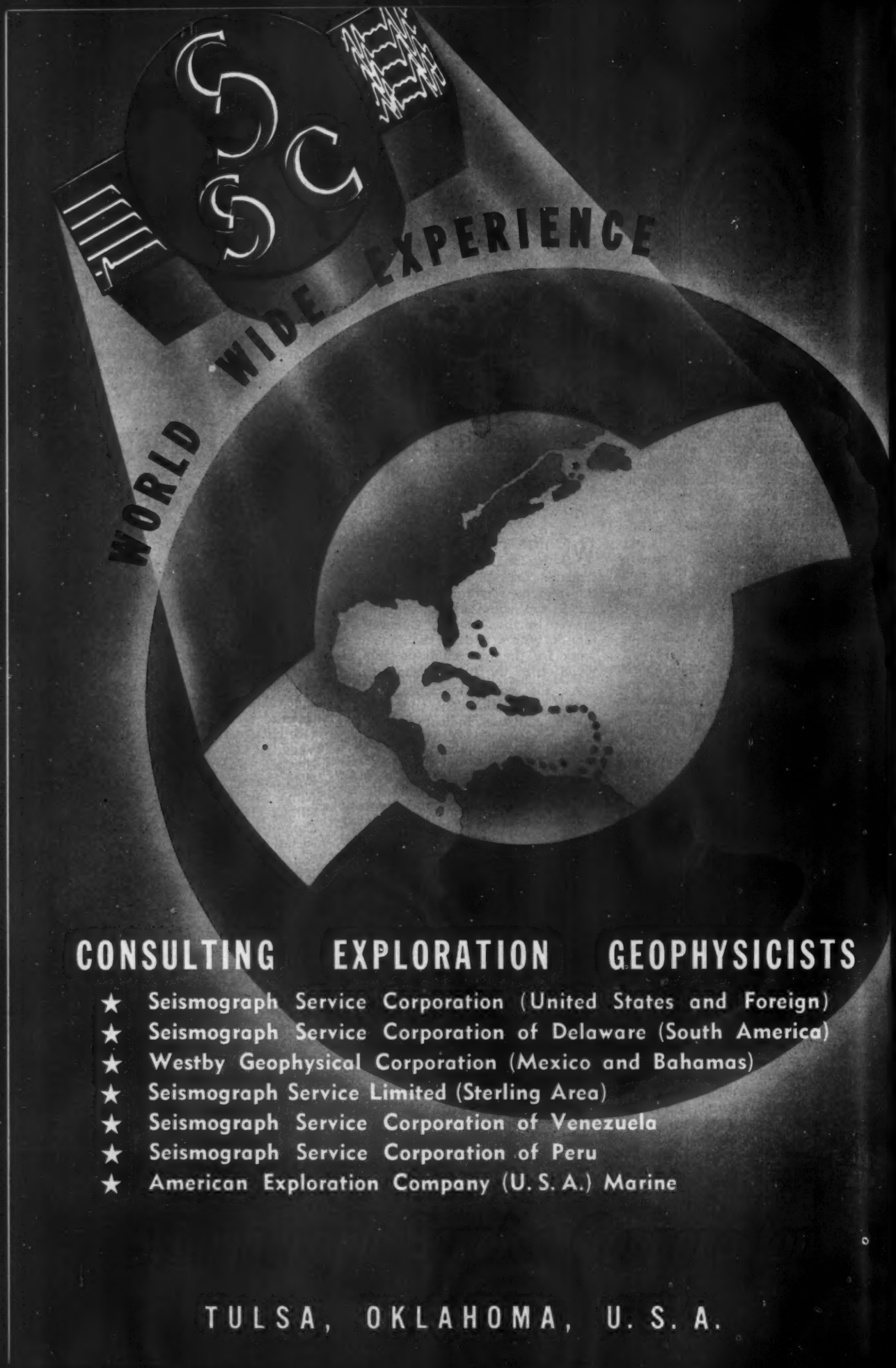
As the committees prepared to swing into action, Oil and Gas Division statistics indicated that the stock position in Districts 1 and 3 was relatively worse,

Stressing the urgency of the situation and the need for quick action, Hallanan notified committee members by telegraph of their appointment.

The committees are large, so as to get both adequate geographic and complete industry representation, their membership being as follows:

District 1 committee: B. I. Graves, Tide Water Associated Oil Co., New York, chairman; M. J. Rathbone, Esso Standard Oil Co., New York, vice chairman; F. G. Bannerot, Jr., Elk Refining Co., Charleston, W. Va.; R. J. Bartlett, Gulf Oil Corp., Pittsburgh; John Dressler, New Jersey Gasoline Retailers Association, Hackensack; J. E. Dyer, Sinclair Oil Corp., New York; J. B. Fisher, Kendall Refining Co., Bradford, Pa.; J. Parks Gwaltney, National Council of Independent Petroleum Associations, Durham, N. C.; Harry B. Hilts, Empire State Petroleum Association, New York; Walter Hochuli, The Texas Co., New York; Dean F. Hodges, Shell Oil Co., New York; W. E. Huston, Republic Oil Refining Co., Pittsburgh; Wiley H. Moore, Wofford Oil Co., Atlanta; A. L. Nickerson, Socony-Vacuum Oil Co., New York; J. B. Richdale, Colonial Beacon Oil Co., Boston; H. G. Schade, Atlantic Refining Co., Philadelphia; J. W. Scott, Buckley and Scott Utilities, Watertown, Mass.; E. J. Smith, Pan American Petroleum & Transport Co., New York; H. B. Van Cleve, Maritime Petroleum Corp., New York; B. S. Watson, Cities Service Co., New York.

District 2 committee: B. L. Majewski, Deep Rock Oil Corp., Chicago, chairman; H. J. Kennedy, Continental Oil Co., Ponca City, Okla., vice chairman; H. T. Ashton, Socony-Vacuum Oil Co., St. Louis; S. C. Bartlett, The Texas Co., Chicago; Reid Brazell, Leonard Refineries, Inc., Alma, Mich.; L. S. Corbin, Standard Oil Co. (Ky.), Louisville; J. Fenner Cummins, Tennessee Oil Men's Association, Nashville; D. M. Dickey, Northwest Petroleum Association, Minneapolis; Louis M. Faber, National Congress of Petroleum Retailers, Milwaukee; Charles Z. Hardwick, Ohio Oil Co., Findlay, Ohio; A. M. Hughes, Phillips Petroleum Co., Bartlesville, Okla.; Carl R. Jonswold, Arrow Petroleum Co., Forest Park, Ill.; Paul Kempf, Staebler-Kempf Oil Co., Ann Arbor, Mich.; Jess Knowles, Skelly Oil Co., Kansas City; P. E. Lakin, Shell Oil Co., New York; J. Howard Marshall, Ashland Oil & Refing Co., Ashland, Ky.; R. W. McDowell, Mid-Continent Petroleum Corp., Tulsa; R. H. McElroy, Pure Oil Co., Chicago; Brown L. Meece, Globe Oil & Refining Co., Chicago; W. H. Merritt, Cities Service Oil Co., Chicago; E. W. Miles, Standard Oil Co. (Ind.), Chicago; Joseph L. Nolan, Farmers Union Central Exchange, St. Paul; A. A. Stambaugh, Standard Oil Co., Cleveland; E. V. Weber, Ohio Petroleum Marketers Association, Columbus; Russell S. Williams, Individually Branded Petroleum Association, Indianapolis.



CONSULTING EXPLORATION GEOPHYSICISTS

★ Seismograph Service Corporation (United States and Foreign)
★ Seismograph Service Corporation of Delaware (South America)
★ Westby Geophysical Corporation (Mexico and Bahamas)
★ Seismograph Service Limited (Sterling Area)
★ Seismograph Service Corporation of Venezuela
★ Seismograph Service Corporation of Peru
★ American Exploration Company (U. S. A.) Marine

TULSA, OKLAHOMA, U. S. A.

PERSONALS

Gulf Production Head Has Broad Experience

E. P. HUBBARD recently appointed superintendent of production, Houston district, for Gulf Oil Corp. has been with Gulf since 1920. He has served as assistant superintendent of production for the past 15 years. Last year he accepted a temporary assignment as manager of Kuwait Oil Co., Ltd., Kuwait, on the Persian Gulf for a period of several months.

A native of Lampasas County, Texas, Hubbard graduated from Texas A. & M. College in 1917. He served as a captain in the infantry during the first World War. Following his discharge he became an instructor in electrical engineering at Texas A. & M., remaining there for a year.

Hubbard succeeded W. C. Clemons, pioneer Texas oil man who has retired, as production superintendent. J. M. Cooper, formerly chief petroleum engineer for the Houston district, has been appointed assistant superintendent to succeed Hubbard.

Hubbard is a former chairman of the Southwest District of the American Petroleum Institute, a past president of the Houston Technical Club, and an active member of the Houston Chamber of Commerce.

Dr. Virgil Scarth, technical section, patent department, Phillips Petroleum Co., Bartlesville, has been elected president of the Oklahoma section of the American Institute of Chemical Engineers. Other new officers include: **Lawrence K. Cecil,** Infilco, Inc., Tulsa, vice chairman; **M. F. Burgess,** research chemical engineer, Cities Service Oil Co., Tallant, Okla., secretary-treasurer; and **H. R. Legatski** and **Russell Ringham,** both of the gasoline department, Phillips Petroleum Co., directors.

Dorsey Hager, well-known geologist, has opened a field office at Holbrook, Ariz., for Rocky Mountain operations.

John S. Ball, senior refinery engineer at the Bureau of Mines experiment station, Laramie, Wyo., has been elected chairman of the Wyoming Section of the American Chemical Society. Ball is engaged in research on sulfur compounds in petroleum, composition of shale oil, and methods for hydrocarbon analysis.

C. E. Starr, Jr., assistant director of the Louisiana Division of Esso Laboratories, Baton Rouge, La., has been elected chairman of the Baton Rouge Section of the American Chemical Society, succeeding **R. S. Asbury,** Ethyl Corp. Starr, formerly research chemist with E. I. du Pont de Nemours & Co., joined Esso in 1936.

Dana S. Mellett, chief engineer of the Trenton, Mich., refinery of Socony-Vacuum Oil Co., Inc., has been appointed vice president of Mediterranean Refining Co. **E. A. Wilson** has been appointed chief engineer to succeed Mellett.

H. L. Spyres, district geologist at Jackson, Miss., for Skelly Oil Co., has been transferred to Corpus Christi, Tex. He was succeeded by **Charles E. Buck** of Jackson.

D. A. Cushman, a pioneer of the natural gasoline industry on the West Coast and a member of the first board of directors of the California Natural Gasoline Association, has retired from Fullerton Oil Co.

John F. Merriam, vice president and treasurer of Northern Natural Gas Co., Omaha, Neb., has been named executive vice president. Merriam has served since 1930 with Northern. Other promotions within the company are: **Asa B. Dilworth,** controller, to vice president and controller; **Harry H. Siert,** assistant treasurer, to treasurer; and **Paul W. Severance,** associated with the treasury department, to assistant treasurer.

J. L. Kennard, Evansville, Ind., president of Kennard Oil Co., Inc., has announced his candidacy for Congress in the eighth congressional district.

Harold W. Manley, general superintendent of the gas and natural gasoline department of Barnsdall Oil Co., has been made manager of the production department in charge of crude oil, natural gas, natural gasoline, engineering and allied activities. He will maintain his office in Tulsa. Manley joined Barnsdall in 1929 as division engineer in the gas and gasoline department, and 10 years later became superintendent of that department.

J. L. Brown, of the regional headquarters in Houston for Shell Oil Co., Inc., has been named manager of the

Officers of the newly organized Golden Trend Chapter of the American Petroleum Institute are shown here at the organizational meeting held recently in Lindsay, Okla. Left to right are Paul Myers, local store manager for Mid-Continent Supply Co., Pauls Valley, Okla., secretary-treasurer; A. K. Hood, production superintendent for Sohio Petroleum Co., Elmore City, Okla., first vice chairman; W. E. Best, district petroleum engineer for Ohio Oil Co., Pauls Valley, chairman; Clift Wise, refining superintendent, Kerr-McGee Oil Industries, Inc., Wynnewood, Okla., third vice chairman; and Ned E. Biffle, president, B & B Drilling Co., Pauls Valley, second vice chairman. Not in the picture are James Wise, fifth vice chairman, and Guy Barrett, fourth vice chairman

PERSONALS

Midland, Tex., area gas-gasoline department for the company. He succeeds **John L. May,** who has been manager of that department since it was established.

James Hayes, geologist for National Associated Oil Co., has been transferred from Illinois to the Denver division office of the company.

W. Alton Jones, president of Cities Service Co., has been awarded the President's Certificate of Merit for his wartime services "as a leader of the petroleum industry" and for "developing and promoting the plans for the Big Inch and Little Big Inch pipe lines." The award was made by Secretary of the Army Royall. Jones was president of War Emergency Pipelines, Inc., which administered the construction of these lines.

D. P. Parker has been appointed manager of the newly created technical and engineering division of the East St. Louis refinery of Socony-Vacuum Oil Co., Inc. **H. F. Killebrew** has been appointed assistant manager in charge of the mechanical section and **H. A. Lutz** has been named assistant manager in charge of the process section.

E. M. Reed, formerly with Shell Oil Co., Inc., in Tulsa, and since 1940 in the oil loan department of the First National Bank, Houston, has been elected vice president of the bank.

T. J. Fuson, Gulf Coast district petroleum engineer for Humble Oil & Refining Co., has been elected 1948 chairman of the Houston chapter of the American Petroleum Institute suceeding **J. U. Teague,** Hogg Oil Co., who becomes chairman of the chapter's advisory board. Other new officers are: **Charles Thornhill,** Thornhill-Craver Co., first vice president; **John Payne,** Shell Oil Co., Inc., second vice chairman; and **Ralph Smith,** Dowell, Incorporated, secretary-treasurer. **Paul Hubbard,** Gulf Oil Corp.; **John Domercq,** Standard Oil Co. of Texas; and **Carlton D. Speed, Jr.,** independent operator, were named to 1-year terms on the advisory board. Elected to 2-year terms were **J. E. Bailey,** Tide Water Associated Oil Co.; **A. W. Waddill,** Houston Oil Field Material Co., Inc.; **E. P. Haynes,** The Texas Co.; and **Byron Meredith,** Meredith, Clegg & Hunt.

Dwight H. Fortine, former field petroleum engineer for Barnsdall Oil Co. in California, has been made chief California geologist for the company. He succeeds **R. T. White,** who has resigned to enter business for himself. Before joining Barnsdall in 1931 Fortine was with Caribbean Petroleum Co. in Venezuela, and was stationed at Maracaibo, the Lagunillas, Mene Grande, and El Cubo fields.

Pat Kelly, geologist for Richfield Oil Corp., has resigned to do consulting work in California and Wyoming.

Don Spellman, petroleum engineer for Ohio Oil Co., has been transferred from Iraan to Bay City, Tex., where he is district engineer.

J. H. Tucker, Jr., has resigned from Gulf Oil Corp. and opened an office in Houston as consulting petroleum engineer specializing in the reservoir and workover field. A 1929 graduate of the University of Texas, Tucker joined Gulf in 1931 after 2 years with Houston Natural Gas Co. With Gulf he was petroleum engineer in East Texas field until 1936, when he was moved to Houston as petroleum engineer supervising subsurface pumping equipment and oil treating. After 1938 he supervised workover and well analysis and reservoir work for Gulf, becoming district reservoir engineer.

F. R. Corbell, Magnolia Petroleum Co. producing department, assumed the duties of superintendent of the Shreveport division as of February 1. He was formerly assistant superintendent of the Gulf Coast division, at Houston. **W. B. Powers,** formerly district superintendent at Lake Charles, La., succeeded Corbell at Houston. **Lester A. Daniel,** superintendent of the Kermit, Tex., district, moved up to district superintendent of the Lake Charles district, and was succeeded at Kermit by **C. F. Stephenson. D. A. Murphy,** production foreman at Duncan, Okla., succeeded Stephenson as superintendent of the Wewoka, Okla., district.

J. R. Parten, Houston, president of Woodley Petroleum Co. and chairman of the board of Premier Oil Refining Co. of Texas, has been reelected as chairman of the board and agent for the Federal Reserve Bank of Dallas.

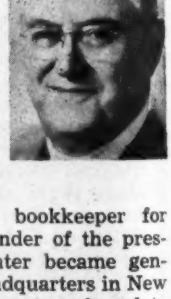
E. L. Petree was recently appointed chief petroleum engineer, Houston district, production department, for Gulf Oil Corp.

Bushrod B. Howard, a director of Standard Oil Co. (N.J.), has been awarded the Presidential Certificate of Merit. He was cited for his fidelity and meritorious conduct during World War II as an adviser and counselor on problems concerning oil tankers, tanker operation, and petroleum distribution.

W. O. Allen, formerly with the geological department of Bay Petroleum Corp., has been placed in charge of the new geological department of the National Cooperative Refinery Association at Wichita.

E. T. Heck, chief geologist for Quaker State Refining Corp., Bradford, Pa., has been appointed program chairman for the eastern district conference of the production division, American Petroleum Institute, in White Sulphur Springs, W. Va., June 30-July 2.

C. W. Overton, for 22 years with Standard Oil Co. (N. J.) affiliates, and more recently assistant manager of the marketing department for Carter Oil Co., has been named vice president and director of the company in charge of that department. The marketing department headquarters is being moved from Tulsa to Denver. Overton succeeds **F. W. Butler,** who has moved to New York to serve in a marketing capacity with Jersey Standard. **James Lewark,** geologist with Carter, has been transferred from Centralia, Ill., to Fort Smith, Ark., for special work in east central Oklahoma and western Arkansas.



Edward M. Skeehan, vice president and former treasurer and board of directors member of Barnsdall Oil Co., has retired after more than 40 years service with the company. In 1906 Skeehan was employed as personal bookkeeper for T. N. Barnsdall, founder of the present company. He later became general auditor with headquarters in New York. In 1932 he was transferred to California as vice president. He returned to Tulsa in 1940 and the following year was elected treasurer of Barnsdall. In 1943 he was elected to the board of directors. Skeehan resigned from the latter two positions last May. He plans to make his home in California.

Walter B. Pyron, Gulf Oil Corp.'s London representative, has returned to London after a short business trip to New York. Pyron is also a director of Gulf Exploration Co. (Great Britain) Ltd. This is the Gulf subsidiary which holds a 50 per cent interest in Kuwait Oil Co., Ltd.

Kenneth Boling, geologist with Pure Oil Co. in Michigan, has resigned to join **S. D. Jarvis** at Evansville, Ind. **D. L. Foote,** graduate geologist, also has joined Jarvis.

G. E. Walker, president of United Natural Gas Co., Oil City, Pa., has been elected to the board of directors of the Pennsylvania Natural Gas Men's Association.

C. A. Blanchard, acting chief engineer for Houston Natural Gas Corp. since March 1946, has been appointed chief engineer for the company.

J. M. Coffield, formerly an engineer with the Cotton Valley Operator's Committee in Cotton Valley, La., has joined Sohio Petroleum Co. in Shreveport district offices as production engineer.

Don D. Little, petroleum engineer with Standard Oil Co. of Texas in Houston, was awarded the Army's Silver Star for wartime gallantry in action during recent presentation ceremonies in Standard of Texas' Houston office.

SHIFTS—

W. L. Crothers, engineer, Humble Oil & Refining Co., Midland to Houston; **L. J. Hartmangruber,** superintendent, Rowan Drilling Co., Buras to New Orleans; **Joe M. Coffield,** engineer, Cotton Valley Operator's Committee, Cotton Valley to Shreveport; **A. C. Elliott,** geologist, Shell Oil Co., Inc., Lake Charles, La., to Midland, Tex.; **Edward J. Dost, Jr.,** engineer, Standard Oil Co. (Ind.), Whiting, Ind., to Chicago; **Lee Doyle,** foreman, Sinclair Refining Co., Mechanicsburg, Pa., to Bryan, Tex. **William T. Wells,** engineer, Gulf Oil Corp., Philadelphia to Lansdowne, Pa.

George E. Briggs, Jr., engineer, Stanolind Oil & Gas Co., Wewoka, Okla., to Ulysses, Kans.; **O. C. Smith,** superintendent, Richfield Oil Corp., Bell to Wilmington, Calif.; **C. D. Mims,** engineer, Standard Oil Co. of Texas, Houston to Gainesville, Tex.; **Robert G. Mills,** foreman, United Geophysical Co., Laredo to Cotulla, Tex.; **E. S. Miles,** engineer, Phillips Petroleum Co., Smackover, Ark., to Odessa, Tex.; **George P. Zebal,** geologist, California Co., Lexington, Ky., to New Orleans; **Darl D. Gillespie,** engineer, Stanolind Oil & Gas Co., Tulsa, to Ulysses, Kans.

David A. Kinney, foreman, Stanolind Oil & Gas Co., Mannford, Okla., to Denver City, Tex.; **William S. McCready,** engineer, Phillips Petroleum Co., Ardmore to Andarko, Okla.; **J. E. Hinzman,** superintendent, Southern Natural Gas Co., Tarrant, Ala., to Cameron, W. Va.; **James R. Harms,** foreman, Carter Oil Co., Warren to Camden, Ark.; **B. M. Bradley,** engineer, Carter Oil Co., Mattoon, to Carmi., Ill.; **P. James Perille,** engineer, Standard Oil Co. (Ind.), Whiting Ind., to Chicago, Ill.

Roy A. Irons, engineer, Stanolind Oil & Gas Co., Nutley, N. J., to Foreman, Ark.; **Lewis B. Moon,** superintendent, Sinclair Refining Co., Mechanicsburg, Pa., to Bryan, Tex.; **J. W. Best,** engineer, Gulf Oil Corp., Philadelphia to Chester, Pa.; **R. C. Pannier,** superintendent, Gulf Oil Corp., Philadelphia to Chester, Pa.; **C. L. Allison,** engineer, Socony-Vacuum Oil Co., Augusta, Kans., to Casper, Wyo.; **H. M. Houghton,** geologist, Amerada Petroleum Corp., Alva to Tulsa; **James C. Conner,** engineer, Stanolind Oil & Gas Co., Oklahoma City to Tulsa.

K. G. Kugler, engineer, Standard Oil Co. (Ind.), Tulsa to Plainfield, N. J.; **L. M. Rhea,** superintendent, Wheless Drilling Co., Carthage, Tex., to Junction City, Ark.; **Austen M. Shook,** engineer, The Texas Co., Freer to Alice, Tex.; **L. H. Simpson,** superintendent, Helmerich & Payne, Inc., Brookhaven, Miss., to Chickasha, Okla.; **E. M. Reese,** foreman, T. M. Deal Oil & Gas Co., Burrton to Holyrood, Kans.; **E. W. Steffenhagen,** engineer, Shell Oil Co., Inc., Lake Charles, La., to Grand Junction, Colo.; **Paul H. Schwan,** engineer, Standard Oil Co. (Ind.), Alton to Wood River, Ill.

DEATHS

Richard Airey, 79, founder and former president of Asiatic Petroleum Corp., died February 1 in Billinghurst, Sussex, England. During World War I he was an adviser to the British Admiralty on the procurement of American oil for the British fleet. Before retiring and returning to England in 1935, Airey became president of Caribbean Petroleum Co. and Colon Oil Corp., oil producing firms in Venezuela, and a director of Shell Union Oil Corp. and Canadian Eagle Oil Co., all of the Shell group.

Dr. August C. Klein, 61, vice president and engineering manager of Stone & Webster Engineering Corp., died February 3 in Montego Bay, Jamaica, B.W.I. Klein was a gas engineer for United States Improvement Co. in Philadelphia and after the war joined Stone & Webster Engineering Corp. in its Boston office as gas engineer.

H. H. Brewster, 54, vice president of Cascade Petroleum Co. and former general drilling superintendent for Davidson Drilling Co., died February 7 in Fort Worth. In 1925 he served as general production superintendent for Pure Oil Co., and later became associated with Lion Oil Co.

Arthur James Blake, 70, former construction foreman for Magnolia Petroleum Co. in Dallas, died February 3 in Dallas.

Jack A. Lewis, 35, production engineer for Tennessee Gas Transmission Co., died February 1 in Houston. Prior to joining Tennessee Gas last year, Lewis had been an examiner in the Oil and Gas Division, Department of the Interior, for 7 years.

Clyde G. Morrill, 58, executive secretary of the Independent Oil Men's Association of New England, died February 5 in Boston. Morrill served as a member of the National Petroleum Industry Council and was recently appointed to serve as a New England representative on the National Petroleum Council.

Charles Taylor McDowell, 86, independent oil operator and a partner in Ritchey Oil Co., died January 24 in Franklin, Pa.

Robert Thomas Moore, 81, driller who worked the Texas, Oklahoma, California, and Colorado fields, died February 1 in Oil City, Pa.

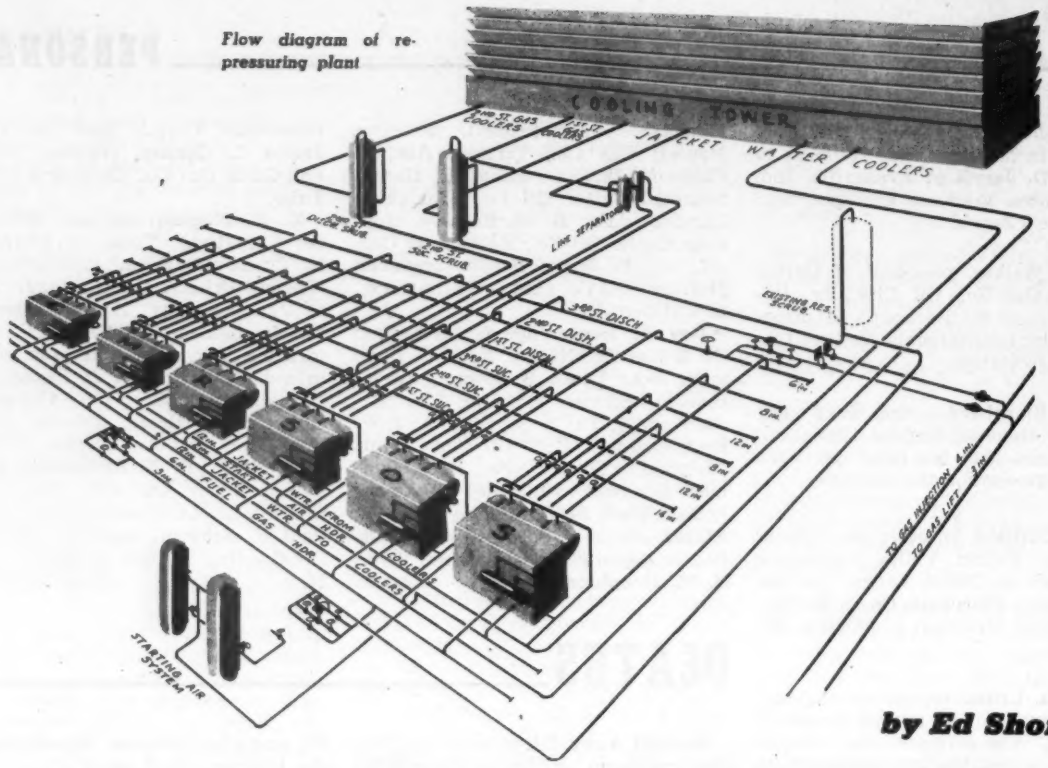
William Watson, district manager of the Tulsa office of Chain Belt Co., Milwaukee, Wis., died recently in Midland, Tex.

James R. Bower, 69, president of Murko Oil & Royalty Co., Dallas, died February 2 in Dallas.

John Riley Atkinson, 69, Houston independent oil operator, died December 4 in Houston.

O. S. Chapin, 75, associated with several pioneer Turner Valley companies and vice president of North Continental Oil & Gas Corp., died recently in Calgary.

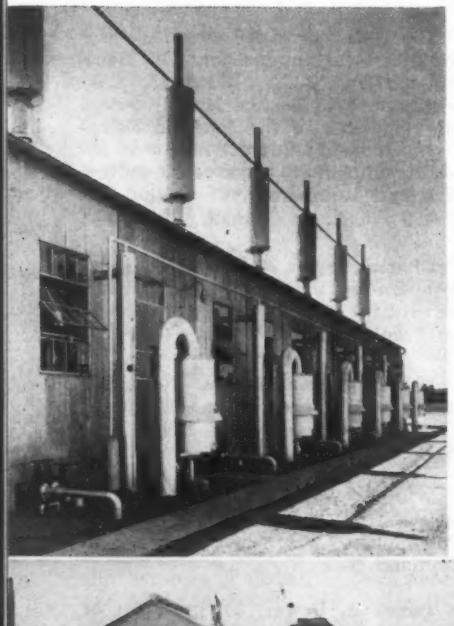
Otto J. Herrelson, 46, Chicago oil operator and president of Herrelson Oil Co., died February 9 in Chicago.



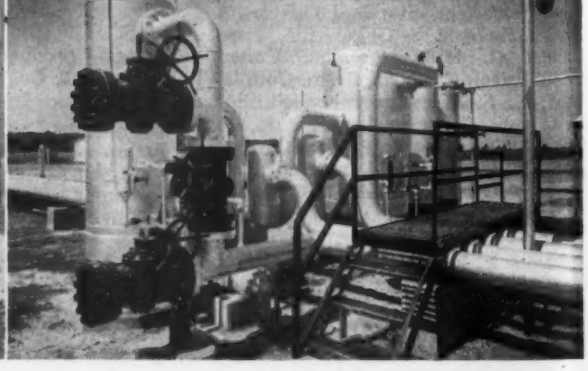
Flow diagram of re-pressuring plant

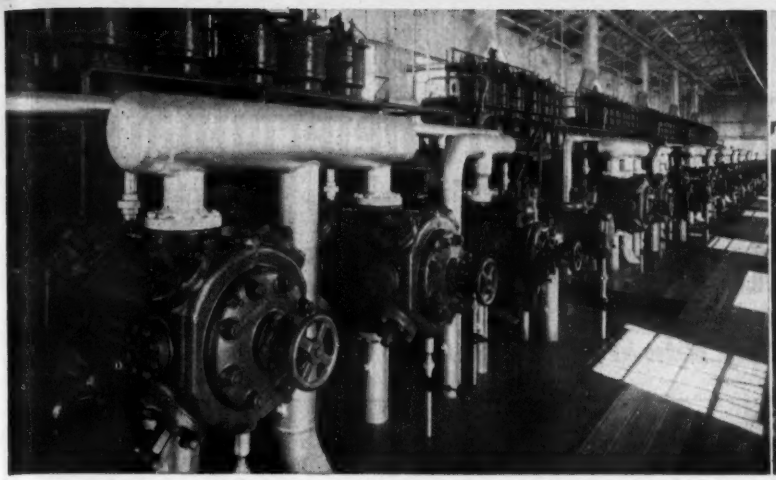
by Ed Short

PRESSURE-MAINTENANCE PROJECT Operates on COOPERATIVE Basis



Left: Back-side view of Warren Petroleum Corp.'s gas booster plant for repressuring Fairbanks field in Harris County, Texas. Note the neat and efficient arrangement of air intakes, exhaust silencers and fuel regulators for the compressor units. This booster plant is located at the Warren Fairbanks gasoline plant. Below, left: Booster-plant header system for three stages of compression from 35 to 2,500 psi. Right to left: First-stage suction and discharge, second-stage suction and discharge, third-stage suction and discharge, and 800-psi. gas-lift header. Right, below: Second and third-stage suction scrubbers equipped with Magnetrol high-level shutdown devices





Left: Six 600-hp. three-stage compressors. These units have a total capacity of 14 million standard cubic feet per day at a discharge pressure of 2,500 psig. Right: A. E. Sweeney, Jr., field engineer for Fairbanks committee, and H. J. Bourke, Warren plant superintendent

THE repressuring of Fairbanks field in Harris County, Texas, is an outstanding example of what may be accomplished in gas conservation work through cooperation, even when a large number of companies, both major and independent, are involved. There are 21 companies in this field and all but one company, which owns one lease, signed the operating contract to return residue gas to the sand.

Warren Petroleum Corp., cooperating in this pressure-maintenance project, furnishes high-pressure gas for injection from a booster plant especially constructed for this purpose at the Warren gasoline plant. Amortization of this plant will be handled through payment by operators for recompression service. The amount of gas compression each operator pays for is determined by a factor based upon the total amount of gas produced by all of the properties in the field.

Structurally, Fairbanks field is a large anticlinal dome involving approximately 4,000 acres. The discovery well was completed in December 1937, and at the present time there are 274 producing wells in the field. Production is coming from a horizon known locally as the main Fairbanks sand, which occurs at a depth of approximately 6,800 ft., and ranges in thickness from 15 to 100 ft.

The Warren repressuring plant consists of six 600-hp. 3-stage Clark compressors. Gas from the gasoline plant enters the booster plant at 35 psi. and is boosted to approximately 2,500 psi. This plant, which was designed and constructed to Warren Petroleum Corp.'s specifications by O. L. Olsen, Houston, has a capacity of 14 million cubic feet per day at a discharge pressure of 2,500 psi.

There are three gas-injection wells in the field, each equipped with 2-in. tubing and packer. At the present time these injection wells are taking a total volume of residue gas amounting to 15½ million cubic feet per day at a well-head pressure of 1,900 psi. Approximately 45 wells in the field are on gas lift, and the remainder flow naturally. Four 2⅜-in. lines from the Warren plant furnish gas to the various parts of the field at 800 psi. to be used by the operators for gas lift.

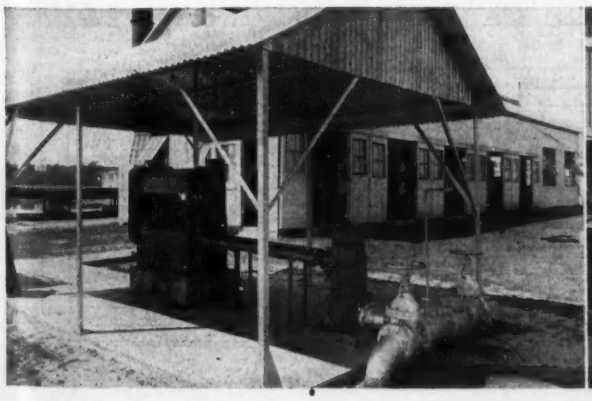
During the past 4 months of operation more than a billion cubic feet of gas has been returned to the sand in this field. At the present rate of injection, the Fairbanks Operators Committee estimates that over 1¼ billion cubic feet of gas will be injected during the next 3 months.

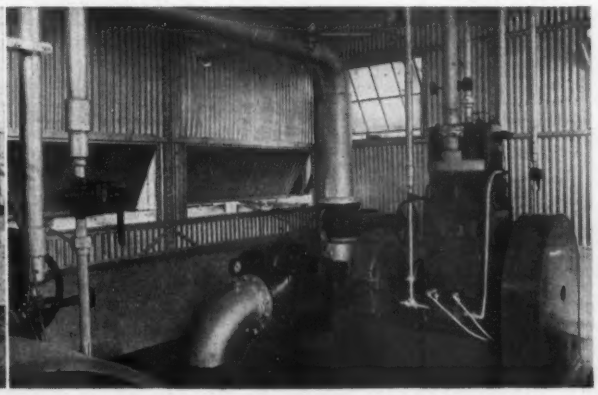
While the primary object of this repressuring program is to conserve the gas which previously was being popped, the operators have estimated that recoverable reserves might be increased by approximately 4 million barrels as a result of returning the residue gas to the sand. To date, the field has produced approximately 23½ million barrels of oil. The reserves, including the increase which may be expected from repressuring, have been estimated at 16 million barrels.

The present allowed production from Fairbanks field is 5,738 bbl. per day. As a result of repressuring the allowable was increased approximately 1,000 bbl. per day as of January 1, 1948.

Operators in this field are: T. J. Ahern; Amerada Petroleum Corp.; A. W. Crosby, Gem Oil Co., C. N. Housh; Johnson & Johnson; Moran Corp.; Noble & Baker; E. W. Ogden; Haynes B. Ownby; Rancho Oil Co.; S. W. Richardson; Showers & Moncrief; Sinclair Prairie Oil Co.; Skelly Oil Co.; Sohio Petroleum Co.; Stanolind Oil & Gas Co.; Union Producing Co.; H. E. Williams and F. A. Gillespie & Sons; H. E. Williams; H. E. Williams and Lundy & Pyle; and Windsor Oil Co.

Left: Cooling-tower pump house showing 4,000-g.p.m. centrifugal pump and speed increaser, driven by two-cycle engine. Right: Gravel-packed water well equipped with deep-well turbine pump driven by gas engine





STRAIGHT-LINE CHART Determination Of Absorber-Extraction Efficiency

*by Edward G. Ragatz**

THE recently proposed straight-line chart method of absorber analysis has been broadened and refined with the resultant development of a highly significant over-all performance factor. This factor has been given the designation of extraction efficiency, and expresses the ratio (in terms of per cent) of the theoretical minimum to actual lean-oil rate required to effect a 95 per cent butane recovery at any particular absorber effectiveness under any given base conditions of absorber operation. Application of this factor to a wide range of commercial units indicates the possibility of markedly improving the effectiveness of present-day high-pressure absorbers.

A TECHNIQUE based on an experimentally developed straight-line absorption chart was recently proposed† for meeting the following requirements of a universal method of evaluating absorber operating effectiveness:

1. Use only "terminal" operating data readily obtainable from any normal commercial absorber installation.

2. Directly evaluate the absorber's effectiveness under actual conditions of operation without reference to divergencies from original conditions of design.

3. Avoid the use of estimated or calculated "internal" factors or conditions, thus eliminating all need for employment of personal judgment in analyzing the column test data.

4. Designate the column's effectiveness for recovery of both isobutane and n-butane by the same number—thus avoiding the "dual efficiency" complications encountered with the classical Kremser-Brown analysis at higher pressures.

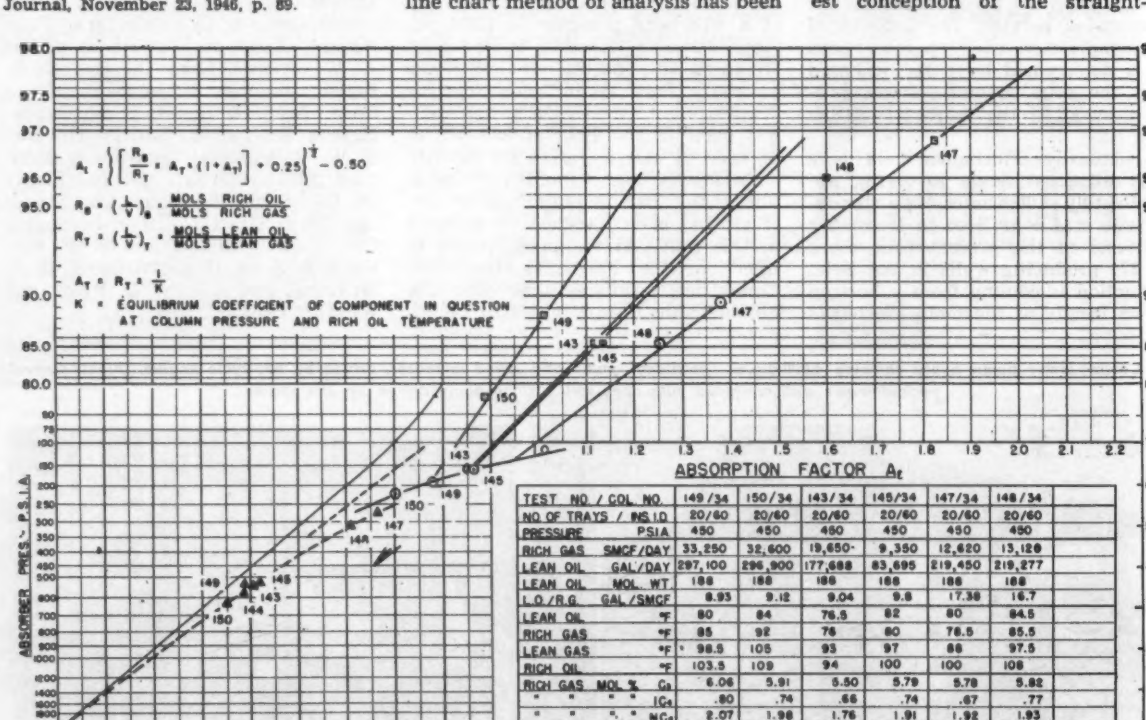
5. Provide an automatic check on the validity of both the test data proper, and the laboratory analyses of the test samples.

During the last year this straight-line chart method of analysis has been applied to the study of a large number of special tests on absorbers ranging in pressure from 50 to 1,800 psig. As a result, the original chart layout has been refined in considerable detail, and an "extraction efficiency" factor derived therefrom whereby the over-all column effectiveness under any given operating condition may be defined by a single consistent evaluating number.

Fig. 1 is representative of our latest conception of the straight-line

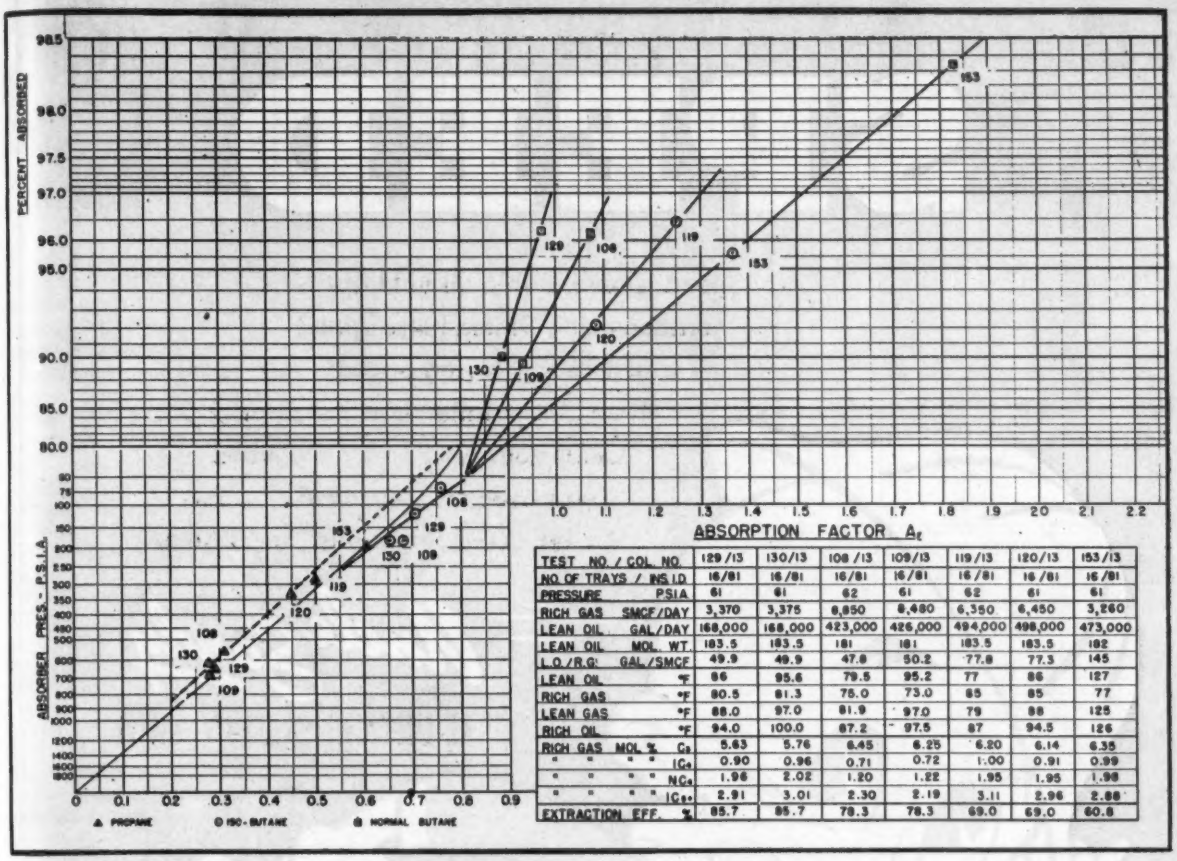
*Absorption specialist, San Marino, Calif. Paper presented before joint meeting of California Natural Gasoline Association and Southern California Section of American Institute of Chemical Engineers.

†Ragatz and Richardson: "Evaluation of Absorber Operating Efficiency," (1946 C.N.G.A. fall meeting), The Oil and Gas Journal, November 23, 1946, p. 89.


$A_t = \left\{\left[\frac{R_B}{R_T} \cdot A_T \cdot (1 + A_T)\right] + 0.25\right\}^{\frac{1}{2}} - 0.50$
$R_B = (\frac{L}{V})_B = \frac{\text{MOLS RICH OIL}}{\text{MOLS RICH GAS}}$
$R_T = (\frac{L}{V})_T = \frac{\text{MOLS LEAN OIL}}{\text{MOLS LEAN GAS}}$
$A_T = R_T \cdot \frac{1}{K}$
K = EQUILIBRIUM COEFFICIENT OF COMPONENT IN QUESTION AT COLUMN PRESSURE AND RICH OIL TEMPERATURE
ABSORPTION FACTOR A_t
ABSORBER PRES. - P.S.I.A.
PERCENT ABSORBED
▲ PROPANE ● ISO-BUTANE ■ NORMAL BUTANE

TEST NO / COL NO.	149/34	150/34	143/34	145/34	147/34	148/34
NO OF TRAYS / INS.I.D	20/60	20/60	20/60	20/60	20/60	20/60
PRESSURE PSIA	450	450	450	450	450	450
RICH GAS SMCF/DAY	33,250	32,600	19,650	9,350	12,620	13,120
LEAN OIL GAL/DAY	297,100	296,900	177,688	83,695	219,450	219,277
LEAN OIL MOL. WT	188	188	188	188	188	188
L.O./R.G. GAL/SMCF	8.93	9.12	9.04	9.8	17.38	16.7
LEAN OIL °F	80	84	76.5	82	80	84.5
RICH GAS °F	85	92	76	80	78.5	85.5
LEAN GAS °F	98.5	105	93	97	88	97.5
RICH OIL °F	103.5	109	94	100	100	108
RICH GAS MOL % C_3	6.06	5.91	5.50	5.79	5.78	5.82
" " " iC_4	.80	.74	.66	.74	.67	.77
" " " nC_4	2.07	1.98	1.76	1.91	1.92	1.93
" " " iC_5	1.60	1.35	1.09	1.23	1.17	1.38
EXTRACTION EFF. %	56.3	56.3	47.1	46.5	40.0	40.0

Fig. 1—Twenty-tray column operation, 450 psia.



TEST NO. / COL. NO.	129/13	130/13	108/13	109/13	119/13	120/13	153/13
NO. OF TRAYS / INS. I.D.	16/81	16/81	16/81	16/81	16/81	16/81	16/81
PRESSURE PSIA	61	61	62	61	62	61	61
RICH GAS SMCF/DAY	3,370	3,375	8,850	8,480	6,350	6,450	3,260
LEAN OIL GAL/DAY	168,000	168,000	423,000	426,000	494,000	498,000	473,000
LEAN OIL MOL. WT.	183.5	183.5	181	181	183.5	183.5	182
L.O./R.G. GAL./SMCF	49.9	49.9	47.8	50.2	77.8	77.3	145
LEAN OIL °F	86	85.6	79.5	85.2	77	86	127
RICH GAS °F	80.5	81.3	75.0	73.0	85	85	77
LEAN GAS °F	88.0	97.0	81.9	97.0	79	88	125
RICH OIL °F	94.0	100.0	87.2	97.5	87	94.5	126
RICH GAS MOL % C_3	5.63	5.76	6.45	6.25	6.20	6.14	6.35
" " " " IC_4	0.90	0.96	0.71	0.72	1.00	0.91	0.99
" " " " NC_4	1.96	2.02	1.20	1.22	1.95	1.95	1.98
" " " " IC_5+	2.91	3.01	2.30	2.19	3.11	2.96	2.88
EXTRACTION EFF. %	85.7	85.7	78.3	78.3	69.0	69.0	60.8

Fig. 2—Sixteen-tray column operation, 61-62 psia.

chart. As indicated, it now consists of a main "per cent recovery vs. A_E" grid and a complementary "operating pressure vs. A_E" subgrid—with a "per cent recovery" reference line drawn across the subgrid to facilitate plotting recovery points which fall on the subgrid portion of the chart (i.e., recoveries below 80 per cent). An appropriate form is also provided for tabulation of pertinent column test data.

The formula for calculating the A_E of the chart has also been further simplified—now being expressed as:

$$A_E = \left\{ \left[\frac{R_B}{R_T} \times A_T \times (1+A_T) \right] + 0.25 \right\}^{1/2} - 0.50$$

Where:

$$R_B = \left(\frac{L}{V}\right)_B = \frac{\text{mols rich oil}}{\text{mols rich gas}}$$

$$R_T = \left(\frac{L}{V}\right)_T = \frac{\text{mols rich oil}}{\text{mols rich gas}}$$

$A_T = R_T \times 1/K$

K = equilibrium coefficient of component in question at column pressure and rich-oil temperature

This latest form of the straight-line chart presents the following analytical characteristics when applied to various conditions of absorber operation and control.

A. In a given column handling a given composition of rich gas at a given pressure under simple (i.e. non-intercooled) conditions of operation with properly stripped lean oil:

1. If the volumes of rich gas and lean oil are held constant and the temperatures of the lean oil and rich gas are changed in approximately the same amount over a fairly small range, or the molecular weight of the lean oil is changed, the resultant recoveries of isobutane and n-butane will change, and all such recoveries above a fairly fixed minimum value (ranging from 75-80 per cent at 60 psia. down to some 35-40 per cent at 2,000 psia.) will be found to lie on a single straight line when plotted against their appropriate A_Es on the straight-line chart.

These lines have been designated "operating lines" in our analytical procedure, and are used to evaluate the column's operating efficiency.

2. If the rich-gas or lean-oil volumes are then changed, and the temperature procedure of (1) above repeated, a series of operating lines of varying slopes will be defined—all intersecting at a common focal point on the operating pressure grid as long as the base conditions of "A" above remain fixed.

3. If the number of trays, or the detailed tray design, is changed and the above procedure repeated, different groups of operating lines will be formed. All such groups, however, will have approximately the same common focal point as long as the base conditions of "A" above remain fixed.

B. If the column pressure is changed, the focal point will then shift both vertically and laterally—with this shift being downward and normally to the left with increasing pressure.

C. If the quality or temperature of the rich gas, or the temperature of the lean oil, is changed appreciably while holding the operating pressure constant, the focal point will shift laterally along an appropriate horizontal "operating pressure" line. Under conditions of extreme temperature change, the slope of the operating line may also shift slightly—with this latter shift being due to a substantial change in the fractionation effect associated with internal recycling of key component fractions.

D. If intercooling is employed, the focal point will again shift laterally along an appropriate operating pressure line—with the degree and direc-

SPEED

Speed is essential to oil field operations, and United helps speed your jobs by giving speedy delivery. No matter how large or small your order may be, when you need it—you need it quickly! You can count on United.

Uncle Sandy

THE UNITED SUPPLY MAN

Courtesy
Service
Dependability

UNITED SUPPLY
AND *Manufacturing* COMPANY
TULSA, OKLAHOMA
Stores in Kansas, Oklahoma, Texas,
Louisiana, and New Mexico

Fig. 3—
umn op

tion o
depen
and lo
ing en

Phas

The
groun
cal ch
straig
be su
lows:

A.
eratin
tion o
1.
emplo
2.
a give
partic
por-li
upon
3.
nal r
by di
and
tures.

B.
tion o
focal
of the
respo
tanes
oil ra
prima
opera

C.
of th
cal p
the r
betw
grate
facto
A
such,
eratin
quali
feren
and
and
inter

Exa

Ty
oper
from
point
1, 2,
1 pr
tray
450 p
3-da
colu
desig
psia.
oper
mall

Fig.
colu
psia.

PE

Fig. 3—Twenty-three tray column operation, 61-66 psig.

tion of this shifting being dependent on the amount and location of intercooling employed.

Phases of the Straight-Line Chart

The functional background for these analytical characteristics of the straight-line chart may be summarized as follows:

A. The slope of the operating line is a function of:

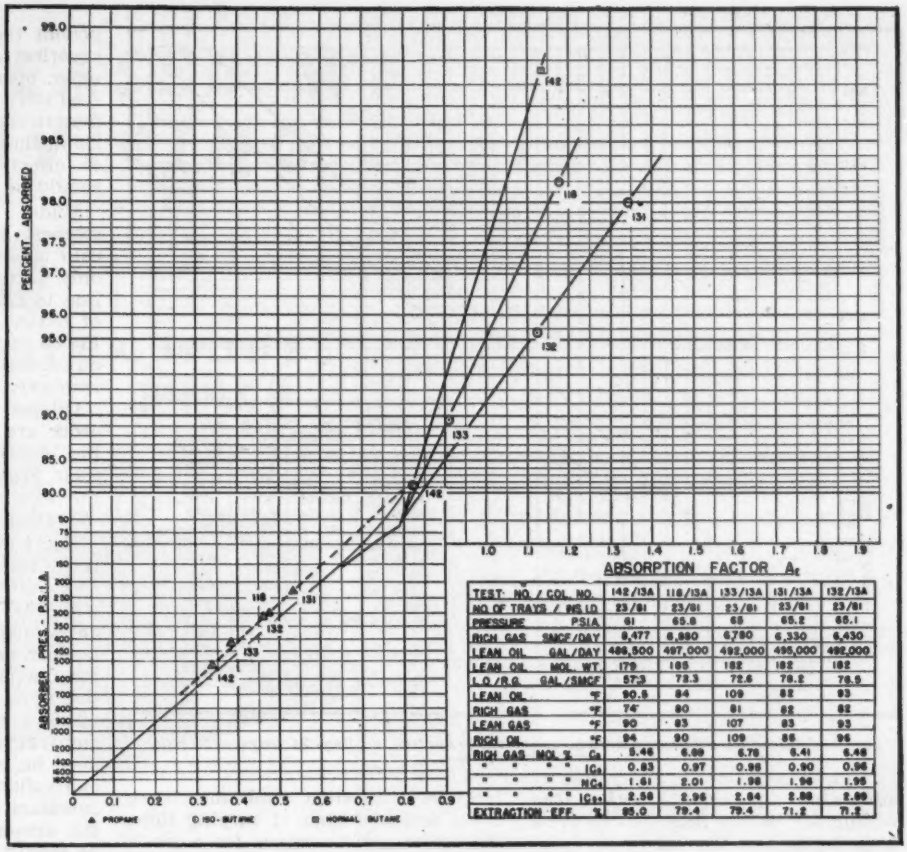
1. The number of trays employed.
2. The adaptability of a given tray design to the particular volumetric vapor-liquid load imposed upon it.
3. The degree of internal recycling developed by differences in lean oil and rich gas temperatures.

B. The vertical location of the operating line focal point is a function of the relative absorptive responsiveness of butanes to changes in lean oil rate and, as such, is primarily influenced by operating pressure.

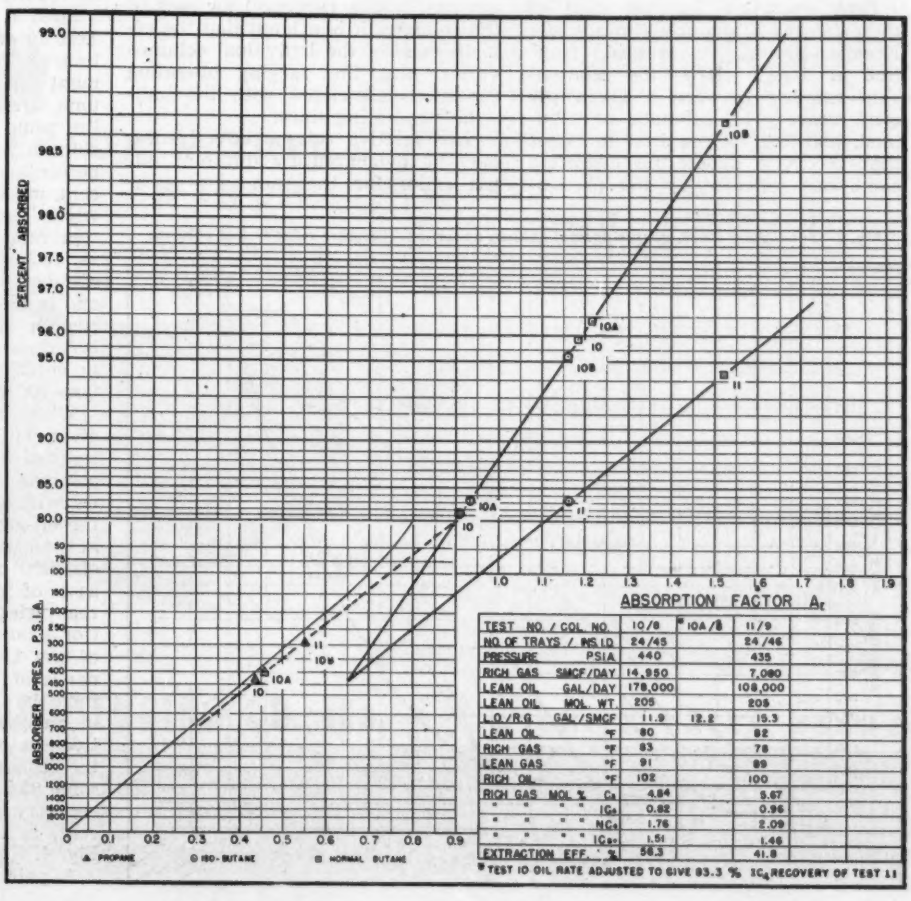
C. The lateral location of the operating line focal point is a function of the relationship existing between the true integrated mean absorption factor and the empirical A_e of the analysis. As such, it is sensitive to operating pressure, rich-gas quality, temperature differences between lean oil and rich gas, and degree and location of column intercooling.

Examples of Operating Lines

Typical examples of operating lines radiating from common focal points are shown in Figs. 1, 2, and 3, in which Fig. 1 presents data on a 20-tray column operating at 450 psia., and Figs. 2 and 3 data on 16 and 23-tray columns of identical tray design operating at 60-65 psia. Marked changes in operating line slope normally associated with



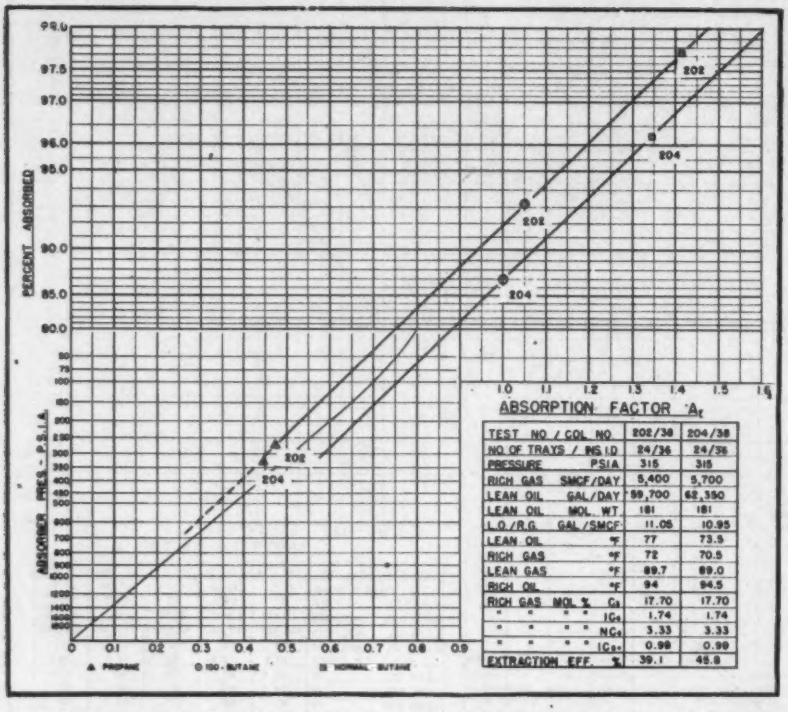
TEST NO. / COL. NO.	142/13A	118/13A	133/13A	131/13A	132/13A
NO. OF TRAYS / INS. I.D.	23/81	23/81	23/81	23/81	23/81
PRESSURE PSIA	61	65.8	66	65.2	65.1
RICH GAS SMCF/DAY	8,477	6,880	6,780	6,330	6,430
LEAN OIL GAL/DAY	496,500	497,000	492,000	495,000	492,000
LEAN OIL MOL. WT.	179	185	182	182	182
L.O./R.G. GAL/SMCF	57.3	72.3	72.6	78.2	76.9
LEAN OIL °F	90.5	84	109	82	93
RICH GAS °F	74	80	81	82	82
LEAN GAS °F	90	83	107	83	93
RICH OIL °F	94	90	109	86	96
RICH GAS MOL % C_3	5.46	6.09	6.78	6.41	6.46
" " " " IC_4	0.83	0.97	0.98	0.90	0.96
" " " " NC_4	1.61	2.01	1.98	1.98	1.98
" " " " IC_{5+}	2.58	2.96	2.84	2.88	2.89
EXTRACTION EFF. %	85.0	79.4	79.4	71.2	71.2



TEST NO. / COL. NO.	10/8	*10A/8	11/9
NO. OF TRAYS / INS. I.D.	24/45		24/46
PRESSURE PSIA	440		435
RICH GAS SMCF/DAY	14,950		7,080
LEAN OIL GAL/DAY	178,000		108,000
LEAN OIL MOL. WT.	205		205
L.O./R.G. GAL/SMCF	11.9	12.2	15.3
LEAN OIL °F	80		82
RICH GAS °F	83		78
LEAN GAS °F	91		89
RICH OIL °F	102		100
RICH GAS MOL % C_3	4.84		5.67
" " " " IC_4	0.82		0.96
" " " " NC_4	1.76		2.09
" " " " IC_{5+}	1.51		1.46
EXTRACTION EFF. %	58.3		41.8

*TEST 10 OIL RATE ADJUSTED TO GIVE 83.3 % IC_4 RECOVERY OF TEST 11

Fig. 4—Comparative 24-tray column operation, 435-440 psia.



TEST NO / COL NO	202/38	204/38
NO OF TRAYS / INS ID	24/36	24/36
PRESSURE PSIA	315	315
RICH GAS SMCF/DAY	5,400	5,700
LEAN OIL GAL/DAY	59,700	62,350
LEAN OIL MOL WT	181	181
L.O./R.G. GAL/SMCF	11.05	10.95
LEAN OIL °F	77	73.5
RICH GAS °F	72	70.5
LEAN GAS °F	89.7	89.0
RICH OIL °F	94	94.5
RICH GAS MOL % C_3	17.70	17.70
" " " " IC_4	1.74	1.74
" " " " NC_4	3.33	3.33
" " " " IC_5+	0.98	0.98
EXTRACTION EFF. %	39.1	46.8

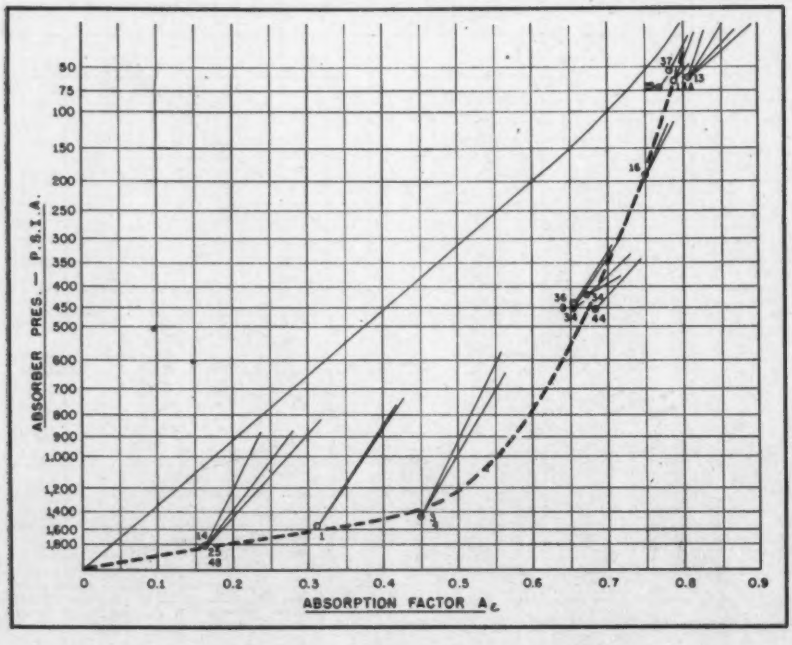
Fig. 5—Intercooled column operation, upper vs. lower-tray cooling, 24 trays—315 psia.

substantial changes in absorber tray loading are clearly indicated in these three figures.

Each operating line on each of these figures is analogous to a single Kremser-Brown "theoretical tray" line in that it shows the relationship existing between a given per cent recovery of isobutane or n-butane, and the A_ϵ required to effect that recovery under the operating conditions reflected by the particular line in question. And since there are a series of lines of varying slope (i.e., different A_ϵ values for a given per cent butane recovery) for each of the columns, it is evident that the effectiveness of the individual columns varies with the varying operating conditions associated with the individual operating lines.

Now relative column effectiveness may be evidenced by different oil-gas ratios for the same key component recovery, or by different recoveries for the same oil-gas ratio—other operating factors being equal. And since $A_\epsilon = f\,(L/V \times 1/K)$, if the factors controlling "K" are held constant, then the oil-gas ratios required to effect a given butane recovery should be directly proportional to A_ϵ.

Fig. 6—Focal-point locus, simple normal column operation. Numbers refer to test columns



Under these circumstances the steepest lines of Figs. 1 and 2 indicate an oil-gas ratio requirement of only 71 per cent that of the flattest line to effect a 95 per cent recovery of butane, while the steepest line of Fig. 3 indicates an 85 per cent requirement for a similar comparative recovery.

Oil-gas ratio differences of this order are of major importance—and Fig. 4 presents direct evidence that their magnitude is truly reflected in the slope of the straight-line chart operating lines.

Fig. 4 presents test data on two 24-tray, 435-440 psia. columns of radically different tray design operating with the same molecular-weight oil on similar quality rich gas at similar lean-oil and rich-gas temperatures for the production of approximately the same isobutane recoveries (81.3 vs. 83.4 per cent). Under such circumstances, only a small adjustment need be made in the oil-gas ratio of one column to exactly duplicate the isobutane recovery of the second, and the amount of such adjustment can be readily calculated.

Such a calculation was made for Test 10 of Fig. 4 under the designation of Test 10A. With this adjustment the chart data shows that column 8, operating under substantially the same temperature conditions as column 9, would recover the same percentage of isobutane, and 2 per cent more n-butane, than column 9 while employing a lean-oil circulation rate only 80 per cent (i.e., 12.2 vs. 15.3 gal. per thousand cubic feet, standard basis) of that of column 9—and in keeping with the previous discussion on operating line slope, the isobutane A_ϵ of test 10A is also found to be 80 per cent that of the isobutane A_ϵ of test 11.

While oil-circulation rates for a given butane recovery may be thus reduced by the use of more effective columns, associated propane recoveries will be reduced in proportion to the oil-gas ratio reduction. This does not mean, however, that the more efficient column has no merit in the case of desired maximum propane recoveries. Rather, it means that (for example) if the higher oil rate of test 11 were retained for maintenance of a higher propane recovery, then the use of such a higher oil rate in an absorber exhibiting the effectiveness of column 8 would increase the isobutane recovery from 83.4 to some 95.2 per cent, and the n-butane recovery from 94.3 to some 98.7 per cent, as indicated by points 10B of Fig. 4.

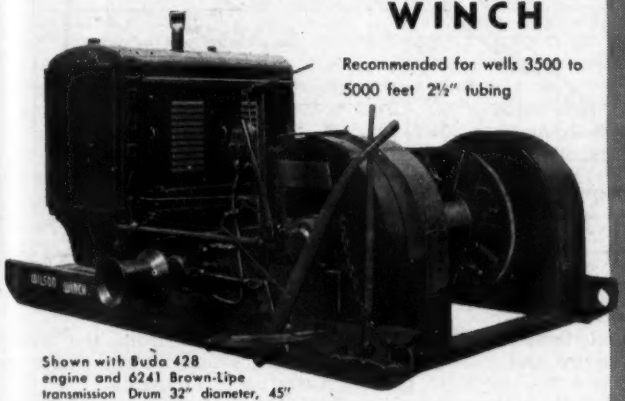
A pair of operating lines from a

INCREASED WELL SERVICING EFFICIENCY

Wilson

SUPER MODEL WINCH

Recommended for wells 3500 to 5000 feet 2½" tubing



Shown with Buda 428 engine and 6241 Brown-Lipe transmission Drum 32" diameter, 45" long, 13" diameter barrel, 8" wide brakes. Cut shows streamline guards on this machine.

Wilson

SENIOR MODEL WINCH

Recommended for wells up to 3500 feet. 2½" tubing

Note full length countershaft with catheads on both ends. Rotary drive sprocket and clutch can be substituted for left cathead. Shown with seat control. Derrick Floor control is standard.

write for the new WILSON Silver Anniversary Catalog.

Longer life, faster operation, more time on the job is what you get when your winch is a Wilson. Powerful, self-energizing brakes give instant response when needed. Jaw or friction clutches are optional, each the best of its type (Super and Mogul Models can be equipped with the Wilson Air-Tube Disc Clutch). Four or eight forward speeds and one or two reverse speeds make these winches flexible enough for all requirements . . . complete reinforcement gives unsurpassed strength and ability to withstand punishment.

★

- CAST, SEMI-STEEL BRAKE RINGS machined after assembly for true running braking surface
- WILSON DISC TYPE FRICTION DRUM CLUTCH, or FREE ROLLING JAW CLUTCH DRUMS, optional
- FULL HARDENED, DOUBLE STEP, REPLACEABLE JAW CLUTCHES
- CAM OPERATED, FULLY EQUALIZED SELF-ENERGIZING BRAKES, OF FULL WRAP TYPE
- ALLOY STEEL, DOUBLE HEAT TREATED SHAFTS, accurately ground to size
- SPLINED SHAFTS wherever possible
- HEAVY DRUM BARRELS, reinforced inside
- DRUM ENDS REINFORCED WITH HEAVY "T" SECTION RIBS
- DRUM BEARING BOLTS CLEAR THROUGH FRAME

WILSON MANUFACTURING CO., INC. WICHITA FALLS, TEXAS

WILSON WINCHES IN STOCK AT • JACK ANDERSON ENGINE COMPANY, KILGORE, TEXAS • MID-CONTINENT SUPPLY CO., KILGORE, TEXAS • MID-CONTINENT SUPPLY COMPANY, ODESSA, TEXAS • MID-CONTINENT SUPPLY COMPANY, SHREVEPORT, LA. • SUPERIOR IRON WORKS & SUPPLY COMPANY, SHREVEPORT, LA. • JONES & LAUGHLIN SUPPLY COMPANY, DUNCAN, OKLA. • JONES & LAUGHLIN SUPPLY COMPANY, WICHITA FALLS, TEXAS • MORVELL-WILDER SUPPLY COMPANY, HOUSTON, TEXAS • AMERICAN SUPPLY COMPANY, KILGORE, TEXAS POWER MFG. & EQUIPMENT COMPANY, LOS ANGELES, CALIFORNIA • WILSON MANUFACTURING COMPANY, INC., WICHITA FALLS, TEXAS

special intercooled column test is presented on Fig. 5. In this particular test the lean-oil and rich-gas rates were held substantially constant, and cooling applied first near the top and then near the bottom of the column for the maintenance of a substantially constant rich-oil outlet temperature. Operating line 202 of Fig. 5 represents the upper-tray cooling run, and line 204 the lower-tray cooling run, of this test.

The superiority of upper over lower-tray cooling for this particular operation is self-evident—while from the straight-line chart angle it is to be noted that this superiority is evidenced by a parallel leftward displacement of the operating line focal point in the case of the more efficient run. Such horizontal shifting of the operating line focal point is characteristic of changes in location or degree of column intercooling, or wide changes in rich gas-lean oil temperature differences.

From evidence presented by a large amount of test data similar to those of Figs. 1-4, it can be postulated that increases of operating line slope approach infinity as a limit, and that at such limit, the base focal point A_ϵ is directly analogous to the classical conception of a "minimum reflux ratio" for an infinite number of trays. This "minimum A_ϵ" concept, in turn, provides a rational basis for reduction of operating line values to a "single number" evaluating factor, which factor we have designated as the:

Over-all extraction efficiency "EE"

and defined as:

$$\text{"EE"} = \frac{A_\epsilon \text{ of the operating line focal point}}{A_\epsilon \text{ of the operating line at 95\% recovery}} \times 100$$

The choice of a 95 per cent recovery base for this efficiency factor was purely arbitrary. However, it was a logical choice in that it represents a fair mean of the higher efficiency isobutane and n-butane-recovery operations currently employed in the industry, and falls at a convenient reference zone on the straight-line chart.

It should be emphasized that this over-all extraction efficiency factor is distinctly different from the classical individual tray efficiency factor in that:

1. It is a measure of over-all column effectiveness rather than individual tray effectiveness.

2. Although accurately defining the slope of the column operating line for any butane recovery, as a direct evaluative number it applies only to a 95 per cent recovery.

3. As such, it expresses the approximate ratio (in terms of per cent) of the theoretical minimum to the actual amount of lean oil required to effect a 95 per cent butane recovery under the particular base operating conditions in question (i.e., column pressure, lean-oil temperature, and rich-gas temperature and quality).

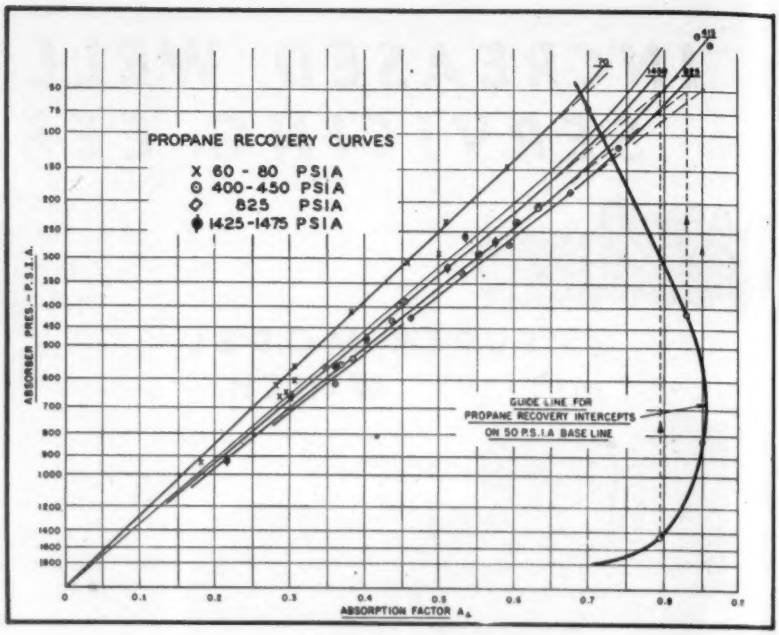

PROPANE RECOVERY CURVES
X 60 - 80 PSIA
⊙ 400-450 PSIA
◇ 825 PSIA
♦ 1425-1475 PSIA
GUIDE LINE FOR PROPANE RECOVERY INTERCEPTS ON 50 P.S.I.A BASE LINE
ABSORBER PRES. - P.S.I.A.
ABSORPTION FACTOR A_A

Fig. 7

Obviously, where the operation of the column as a whole is the primary interest, such an over-all evaluating factor carries much more significance than the classical individual tray-efficiency factor.

Given such an evaluating factor and the previously outlined focal point characteristics of the straight-line chart, it is seen that the operating effectiveness of any column under any condition of operation can accurately be defined by two numbers, namely:

1. The extraction efficiency "EE."

2. The A_ϵ of the operating line focal point.

In the case of simple normal operating columns (i.e., nonintercooled columns operating on rich gases of normal composition at normally encountered rich gas-lean oil temperatures) the basic conditions of the column operation are primarily controlled by the operating pressure, and all focal points cling closely to a single mean "operating pressure—focal point A_ϵ" line. Under these conditions, designation of a focal point A_ϵ can often be dispensed with, and a first order measure of column effectiveness defined by extraction efficiency alone.

Fig. 6 presents an enlargement of the pressure subgrid of the straight-line chart on which we have plotted a series of well-defined focal points for a number of normal operating columns ranging in pressure from 50 to 1,800 psig. Study of this figure shows that only a secondary order of difference in butane yield is indicated as between using an actual test defined focal point, and a corresponding mean focal point from the heavy dashed "locus line" of the figure for pressures up to 1,000 psia.

While procurement of additional test data may result in a future shifting of this normal locus line in the higher pressure region, it is thought to be already quite well defined for pressures up to 600 psia.

Identification and evaluation of propane recoveries is also a function of the straight-line chart. As would be expected, the propane-recovery lines are distinct from the butane-recovery lines, and are independent of the over-all operating effectiveness of most simple commercial columns up to recoveries of the order of 75-80 per cent. However, these lines do shift significantly with operating pressure.

In Fig. 7 we present an enlarged section of the straight-line chart pressure grid on which we have indicated:

1. Typical propane-recovery lines for "normal" columns at four different operating pressures.

2. A "50-psia. intercept" base guide line whereby one can draw a mean "normal" propane-recovery line for any desired operating pressure.

To use this chart, find the A_ϵ value of the intercept of the subject operating-pressure line with the propane-base guide line, and draw a straight line from O-O of the chart to this A_ϵ value at the 50-psia. line. The average normal propane-recovery line will coincide with this straight line up to values of the order of 60-65 per cent recovery, and thence curve slightly upward in keeping with the pattern set by the several recovery lines of Fig. 7.

In using this mean normal propane-

recovery chart, it should be remembered that propane recoveries will increase over the mean-line value with extra-low rich-gas temperatures, and decrease with extra-high rich-gas temperatures. Unfortunately, we have not accumulated sufficient data to date to permit of correlating such deviations with actual differences in rich gas temperatures. Also, propane recoveries will fall below their mean-line values in cases of extra-low column effectiveness—a case at point being runs 147 and 148 of Fig. 1.

Automatic Check on Data

An extremely important attribute of the straight-line chart is the automatic check provided on the validity of test data and analyses of test samples in that, with properly stripped oil:

1. Two or more sets of isobutane and n-butane recovery points obtained with the same vapor-liquid tray loading and narrow range temperature changes on a given column must produce a common operating line.
2. Two or more such operating lines must converge at a common focal point.
3. This focal point must fall on the proper operating pressure line of the subgrid.
4. Associated propane recovery points must fall in their proper position on the chart.

Obviously, even with the most careful test techniques, all test data will not conform exactly with these straight-line chart standards. In justification for the stand that in order to be authoritative such data must reasonably so conform, we can state that:

To date, whenever we have found test data materially deviating from the straight-line chart standards, and have repeated the test, the second set of data has either conformed with said standards, or deviated as much or more from the first set of test data as either deviated from the straight-line chart standards. In other words, we have yet to find a consecutive series of test data consistently diverging from the above defined standards of the straight-line chart.

In this connection, we wish to emphasize that the extreme consistency shown by the plotted data of Figs. 1-4 is the result of:

1. Running extremely carefully controlled tests on well-equipped columns under excellent operating conditions.
2. Charging extra-large volumes of gas samples to the laboratory analytical columns whenever required.
3. Repeating any key tests which failed to conform to the straight-line chart standards.
4. Picking the best of such test data for the illustrative material of the figures.

What Commercial Absorbers Are Doing

Application of the straight-line chart analysis to a large number of special tests on a wide range of absorption columns during the last year has resulted in some rather striking generalizations concerning current commercial column efficiencies—which generalizations may be summarized as follows:

1. All columns, irrespective of tray type or design, vary substantially in extraction efficiency with any substantial change in vapor and/or liquid loading.
2. Such variations are much larger than generally appreciated over normally accepted ranges of column loading.
3. The combination of vapor-liquid loading at which peak extraction efficiencies are attained varies markedly with type and design of tray layout.
4. As a result, a very large proportion of all columns in actual operation today are not only operating well under the best attained efficiencies of the best columns in their particular class, but also well under their own particular "peak" efficiency.
5. Many low-pressure commercial columns operate at extremely satisfactory extraction efficiencies, whereas even the best of present-day high-pressure commercial columns operate at medium to poor extraction efficiencies.
5. We have found nothing in our studies to indicate that the higher-pressure columns cannot be designed to operate at extraction efficiencies approximating those attained with the best low-pressure columns, and much to indicate that they can and will be so designed in the future.

The importance to natural-gasoline-plant economics of the above generalizations is indicated in Fig. 8 on which we present:

1. A plot of extraction efficiency vs. operating pressure for some 86 key tests on 30 different columns—with the boundary of best operation points being defined by a solid "maximum extraction efficiency" curve.
2. The savings in oil-circulation requirements for 90 per cent butane recovery which would be effected over the indicated maximum efficiency operation if the present most efficient columns, irrespective of pressure, were capable of operating at the actually attained 82.5 per cent extraction efficiency of the best 60-psia. columns.

When we realized that these potential savings apply only to the most efficient of present-day commercial units, that probably less than 20 per cent of today's columns are operating at or near the indicated maximums, and that a great many commercial columns are operating far below the indicated "best industry" figures, the magnitude of the potential savings involved (either in the form of reduced oil circulation as per Fig. 8, or in added butane recoveries under conditions of maximum propane production) begins to be appreciated.

With steadily increasing demands for higher recoveries and greater fuel economies facing the natural-gasoline industry, attainment of at least a portion of the potential savings implicit in Fig. 8 would appear a "must" for the not-too-distant future—and it is our trust that the straight-line chart with its associated extraction efficiency factor "EE" will play an important role in this development.

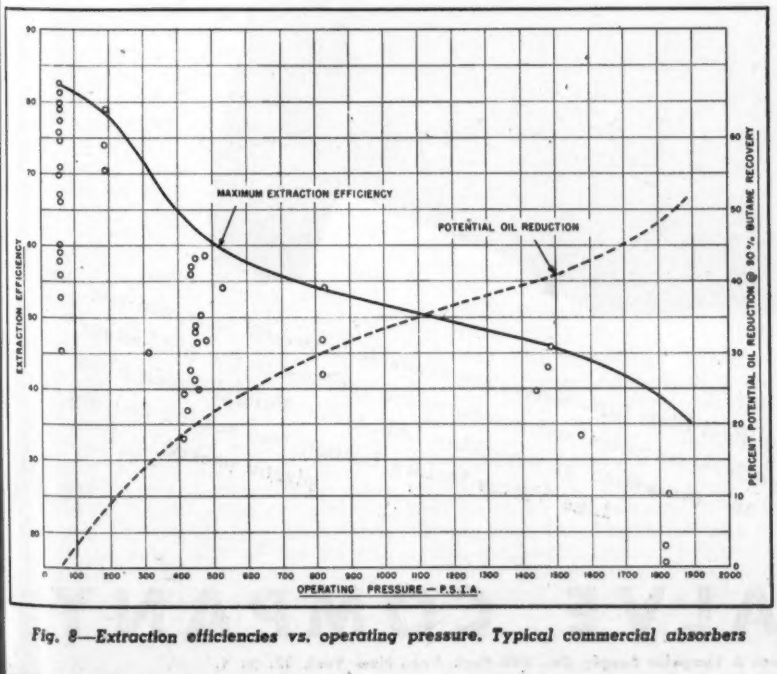

MAXIMUM EXTRACTION EFFICIENCY
POTENTIAL OIL REDUCTION
EXTRACTION EFFICIENCY
PERCENT POTENTIAL OIL REDUCTION @ 90 % BUTANE RECOVERY
OPERATING PRESSURE — P.S.I.A.

Fig. 8—Extraction efficiencies vs. operating pressure. Typical commercial absorbers

Forged Steel

ORBIT* VALVES

FLOW LINE VALVES . . .

Designed for use on high pressure Christmas Tree assemblies and other high pressure service, this 2" External Gear Operated Forged Steel Flow Line Valve is affording trouble-free operation on tough well installations.

This valve is easy and fast to operate and the gearing can be inspected without taking the valve out of service. No lubricant is required to effect a seal. The seats in this valve are highly resistant to abrasion.

2" Forged Steel
6,000 lbs. Test
3,000 lbs. W. P.
10,000 lbs. Test
5,000 lbs. W. P.
(Oil Country Rating)
Full Round Opening
Screwed or Flanged Ends

Orbit Forged Steel Flow Line Valves are available in several sizes and test pressures for both corrosive and non-corrosive services in the production and processing of petroleum. All Orbit Forged Steel Flow Line Valves feature friction free seating and are plastic packed.

*Trademark Registered U. S. Pat. Off.

ORBIT VALVE COMPANY

Export Representative: Jones & Laughlin Supply Co., 230 Park Ave., New York 17, N. Y.

TULSA 1, OKLAHOMA

Oil Prospects in Utah

by
Glen M. Ruby

THE alarming lack of reserves and the accompanying high price of petroleum in the United States have again caused a wave of prospecting in the western states.

Lack of roads and topographic difficulties which were formerly something of a deterrent to prospecting are now largely offset by the prospect of higher prices. There has also been an organized road-building program by the Public Grazing Service that is responsible for good dirt and graveled roads into many favorable areas heretofore considered too remote and expensive for testing.

In Utah more than 20 deep tests are now in progress of drilling or are being planned for 1948. If these do not succeed in finding one or more commercial pools they will at least add materially to the knowledge of the geology of the region. There are too many indications of oil in Utah not to expect that commercial fields will be found.

The wave of prospecting some 20 years ago, which resulted in nearly twoscore of dry holes, so far as oil is concerned, was regarded by the geologists of that time as being conclusive proof of the absence of oil in Utah. An analysis of the reasons for some of these dry holes shows a lack of geological study before the wells were located. It is to the credit of the United States Geological Survey that its geologists have continued to study that region and collect data, which can be of immense service in the prospecting program now under way.

Perhaps no area of equal size anywhere in the world offers the geologist such a wealth of outcrops and apparently such simple geologic structure as southeastern Utah and the neighboring parts of the border states. It is this apparent ease of mapping structural geology, hampered only by the barriers of deep canyons and deserts, that has led to most of the mistakes in both structure and stratigraphy.

While the writer is sanguine of the ultimate success of oil exploration in Utah, he believes that certain facts and phenomena should be pointed out to those who are undertaking this exploration so that they do not make the same mistakes as their predecessors.

In the first place, Utah has a geology all its own. It is a mistake to assume that it is like Wyoming, or Oklahoma, or California. The Uinta basin, in northeastern Utah and northwestern Colorado, has little in common with the area a hundred miles farther south.

In the writer's opinion, much of the prospecting in the Uinta basin is doomed to failure, especially those wells having as their objective the oil-saturated sands in the base of the Green River formation. These sands offer, to the casual observer, an ideal oil-bearing formation under proper structural conditions. However, if the geologist examines them closely he will see that they do not represent an orthodox accumulation of oil. The first peculiarity is that there is no apparent reason for the sands to be saturated. They outcrop on a monotonous monocline dipping gently northward into the Uinta basin and there is no visible evidence of any trap, such as faulting or updip lensing out of the sands.

It was this peculiarity which attracted the writer's attention in 1921 and led to a paper[1] a few years later describing the nature of the saturation. Briefly, it appears to be a matter of contemporaneous deposition of oil and sand from a neighboring land area where oil was escaping down the surface drainage. The Athabaska tar sands, in Canada, appear to represent a similar phenomenon. Under such circumstances it is not to be expected that these sands, even under proper structural conditions, could yield any oil. It was "dead oil" when it was deposited. And with the record of past unconformities in Utah, it will be surprising if some of the other "oil sands" do not have the same origin.

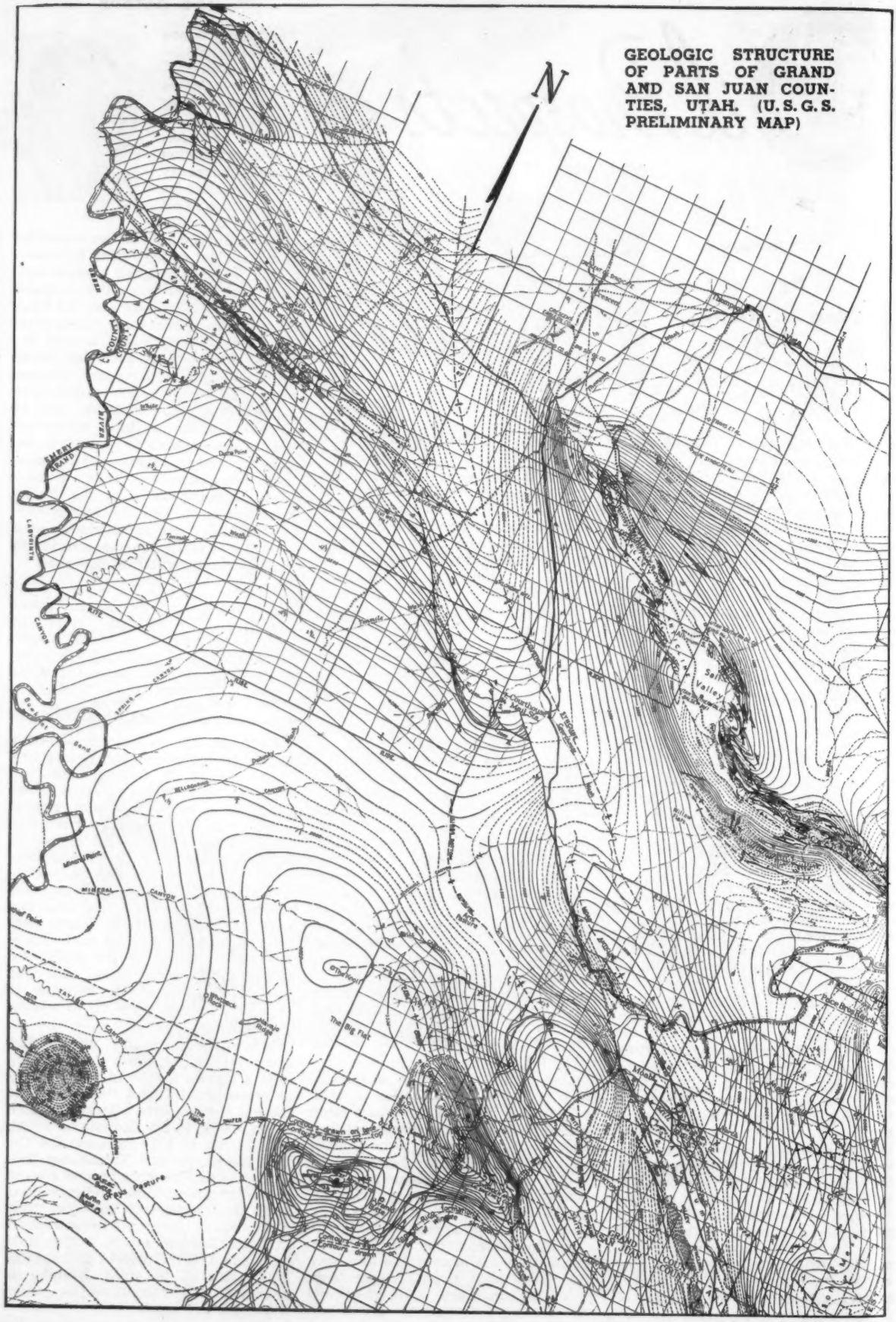
Age of Folding Is Critical Factor

The most critical factor in selecting favorable conditions for prospecting is the age of the folding. This, and the fact that in very recent times there have been important crustal movements, may account for some of the past failures on what appear to be ideal structures. Recent publications by the U.S.G.S., especially Bulletins 908 and 951, should be read carefully by all geologists who expect to explore Utah. They deal largely with the central part of the southeast quarter of the state, the so-called "Paradox basin," and the area which this writer believes to be most likely to yield oil in paying quantities.

However, there are neighboring areas which warrant prospecting after a careful review of their history of recent folding and tilting. One of these is Circle Cliffs, a large anticline south of the Henry Mountains which was drilled in 1921 by Ohio Oil Co. The Moenkopi and Shinarump formations which outcrop on and around this elongated dome indicate that until fairly recent geologic time there was a large oil accumulation in these Triassic sands. A dry hole was drilled on the present structurally high point of the fold. Nothing is known of any unconformities below

The Author

The author is one of the most widely known international petroleum geologists. During the summer months and following graduation from University of Nebraska, he was connected with the U. S. Geological Survey in various capacities and was chief of the Rocky Mountain section when he resigned to enter consulting work. He was chief geologist in the Rocky Mountain area for Marland Oil Co. for several years. During a period of 10 years, he was engaged in petroleum geological work for several South American governments. In recent years, he has been a member of the consulting firm of Hoover, Curtice & Ruby whose activities are devoted to petroleum exploration and management. He is considered one of the best-known authorities on the geology of the Rocky Mountain area, and the accompanying article is based on his studies over a period of many years pertaining to an important section of that area.


GEOLOGIC STRUCTURE OF PARTS OF GRAND AND SAN JUAN COUNTIES, UTAH. (U.S.G.S. PRELIMINARY MAP)
N

the surface and no studies were made to determine the amount of any recent tilting. However, the writer has observed an active oil seepage where the Colorado River cuts across the extreme southeastern end of this fold and exposes the Shinarump sand. As may be seen on the accompanying map, this is some 2,000 ft., structurally, below the present "spilling point" at the opposite end of the structure. This suggests the probability that recent regional tilting has shifted the apex of the dome so that it now lies outside a possible oil field. A tilt to the southeast of as much as 50 ft. per mile would shift the apex many miles to the northwest. This is a feature which should be considered before making a location for a second test.

Another enormous dome, of mountainous proportions, is the San Rafael Swell. It has been drilled to granite on the present structural high. Although a predominantly sand section was drilled, no oil or gas was encountered. However, no rocks recognizable as corresponding to the Paradox formation were drilled. Outcropping on and around the San Rafael Swell are oil-saturated sandstones of the Moenkopi and Shinarump formations. On account of this evidence of oil-bearing rocks of Triassic age, the Farnham and Woodside domes, on the north end of the Swell, appeared to be excellent prospects to find production but both proved to be dry, with only negligible shows in sands, which a few miles away showed indisputable evidence of having been oil bearing before erosion permitted the major part of the oil to escape. It is probable that seismograph studies will indicate these are post-Cretaceous folds and that an adequate trap did not exist in Jurassic or Triassic time.

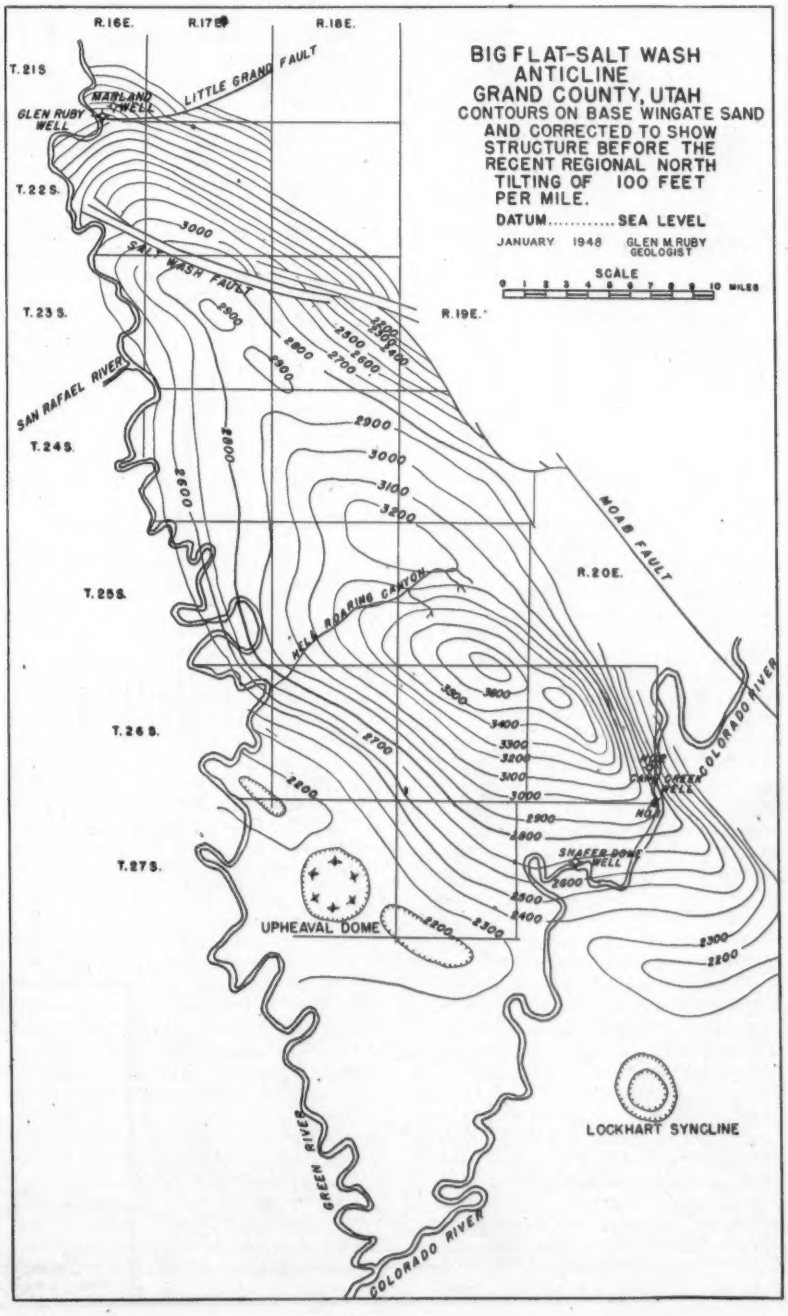
Evidence of Pre-Cretaceous Folding

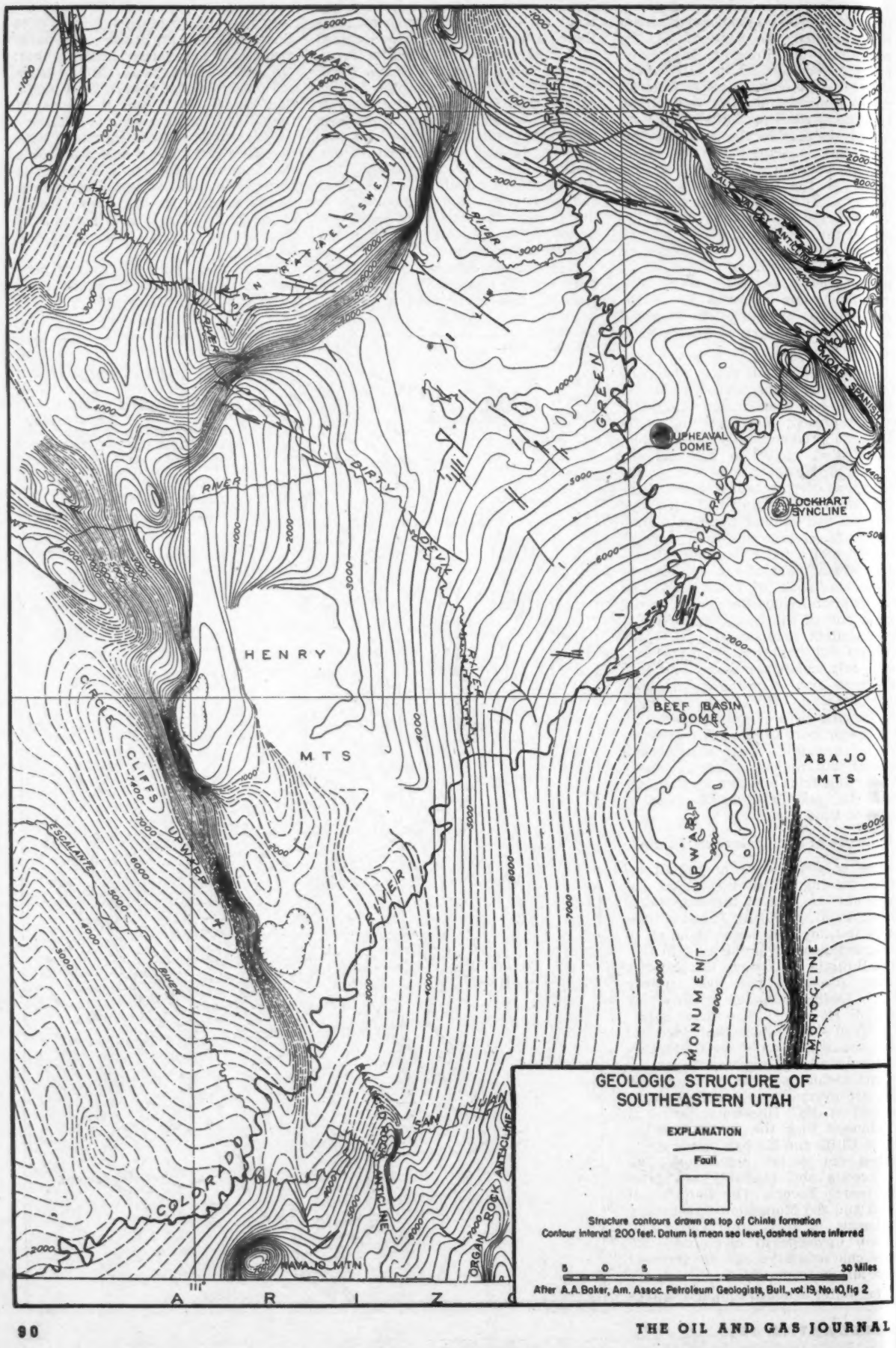
The only evidence of pre-Cretaceous folding which the writer has been able to find in the San Rafael Swell, itself, is during Jurassic time, as is indicated by some thinning of these sediments over the axis. In U.S. G.S. Bulletin 851, pages 104 and 105, Baker discusses the ages during which folding occurred in this part of Utah. He states: "The major deformation in southeastern Utah occurred after the deposition of the Cretaceous rocks, as all the exposed rocks, up to and including rocks of Cretaceous age, are everywhere essentially concordant in dip." He also states: —"it is obvious that the folding of the Circle Cliffs and Kaibab upwarps occurred not earlier than very late Cretaceous and probably not later than early Eocene. The San Rafael Swell and the Monument upwarp are analogous to the Circle Cliffs and Kaibab upwarps in magnitude and other characteristics and are inferred to be of the same age."

The writer is not in complete agreement with the above statement, since there is unmistakable evidence that oil had accumulated in rocks of Triassic age in both the San Rafael Swell and Circle Cliffs. This implies folding earlier than Cretaceous and there is evidence of slight folding in Jurassic time, but undoubtedly by far the greatest folding was, as Baker indicates, of post-Cretaceous age. Just how this folding distorted earlier folds and what effect it may have had on the present location of possible oil fields, is a subjects for thorough geological study.

This writer believes that even later crustal movements have taken place in this part of Utah, and by way of support of this theory cites Baker's statement, in the same paragraph as previously quoted, that: "In the western Book Cliffs, which are on the plunging north end of the San Rafael Swell and the flank of the Uinta basin, rocks of Tertiary age appear to dip concordantly with the older rocks but it seems probable that the dip of the rocks in the Book Cliffs reflect **a later period of folding,** which resulted in the downwarping of the Uinta basin, and is not indicative of the age of folding of the Swell."

(Continued on page 95; map of geologic structure of Southeastern Utah appears on next page.)




GEOLOGIC STRUCTURE OF SOUTHEASTERN UTAH
EXPLANATION
Fault
Structure contours drawn on top of Chinle formation
Contour interval 200 feet. Datum is mean sea level, dashed where inferred
5 0 5 30 Miles
After A.A. Baker, Am. Assoc. Petroleum Geologists, Bull., vol. 13, No. 10, fig 2
HENRY MTS
ABAJO MTS
BEEF BASIN DOME
LISBON VALLEY ANTICLINE
LOCKHART SYNCLINE
UPHEAVAL DOME
MOAB - SPANISH VALLEY ANTICLINE
CIRCLE CLIFFS UPWARP
ESCALANTE
MONUMENT UPWARP
MONOCLINE
NAVAJO MTN
ARIZ
GREEN RIVER
COLORADO RIVER
DIRTY DEVIL RIVER
SAN RAFAEL SWELL
SAN RAFAEL RIVER
FREMONT RIVER
ORGAN ROCK ANTICLINE
BURRO CANYON

And the following sentence by Baker is also important: "Most of the smaller structural features of southeastern Utah probably were formed during the period of deformation that caused the regional upwarps."

The foregoing observations by Baker show the necessity of establishing the age of the folding, by seismograph or surface studies, and then to reconstruct the position of the fold before the late deformation.

Another phenomenon which has been responsible for several dry holes is salt flowage. This is mentioned by both McKnight in Bulletin 908 and Baker in Bulletin 951. All of these "salt domes," except the Upheaval dome, which is in the trough of a syncline, appear to be caused by unloading of sediments in deep canyons, with the result that the salt flows into these areas because of the added pressure due to canyon walls 2,000 ft., and more, higher than the river bed. Only one well drilled in these salt domes produced appreciable quantities of oil, the 1 Cane Creek, but it was in such mechanical condition that it could not be produced.

Doming Very Recent?

This writer believes that the north closure of the Cane Creek "dome" does not exist below the salt, and that the doming which is now visible was very recent. Concerning this well and the general area, Baker states (U.S.G.S. Bulletin 951, page 110): "Most of the wells drilled into the Paradox formation, of Pennsylvanian age, have yielded some showings of oil and gas. The most impressive was obtained in a well drilled on the Cane Creek anticline on the Colorado River a few miles below Moab; a green paraffin-base oil, with a gravity of 36° Baume, and some gas gushed from the well, but the operators were unable to control water from a higher horizon and finally abandoned the well. Wells subsequently drilled on the Cane Creek anticline have failed to obtain such promising shows of oil or gas."

Regarding the thick salt section in the Paradox formation on these anticlines, Baker states, in the bulletin above quoted, on page 26: "Information obtained from many drilled wells in southeastern Utah seems to indicate a tremendous eastward thickening of the formation. However, it is believed that flowage in the salt-bearing beds has caused considerable thickening of the formation at the crests of anticlines so that the thicknesses of the formation determined in wells drilled on the anticlines is probably considerably greater than the normal thickness." This writer agrees that this is the case, as it applies to the Cane Creek anticline, but he believes that the others are due entirely to salt flowage into what becomes, apparently, an axial zone.

In the writer's opinion, as may be seen on the accompanying map of the Big Flat-Salt Wash anticline, there was, until the cutting of the canyon, no actual doming, only the normal south-plunging anticline where the Colorado River crosses this fold. The area shown on the above referred to map is of special interest because of the oil seepages, two on one end and the Cane Creek well on the other. The U.S.G.S. map entitled "Preliminary Map Showing Geologic Structure of Parts of Grand and San Juan Counties, Utah," shows this area on a scale of ½ in. to the mile. The area referred to lies between the Green and the Colorado rivers and is known as the Big Flat anticline.

Determining Age of Folding

This anticline is a good example of what can be done in reconstructing structure and determining the age of the folding. With the present attitudes of the beds as mapped on the base of the Wingate sandstone (Jurassic) it would appear that little closure exists. Also, it would appear that the Cane Creek and Shafer Dome wells had been adequate tests. It must be kept in mind that the area inside the Colorado River Canyon, where the most intense folding is shown, is contoured on top of the Rico (Permian) formation, and as has been previously pointed out, is due to salt flowage.

Since the Big Flat structure, in the writer's opinion, is not only large enough to become one of the largest oil pools in the United States, but is to be thoroughly tested by three wells in the near future, it may be of interest to describe some of its characteristics. The accompanying map of "The Big Flat-Salt Wash Anticline" is contoured on the base of the Wingate, as is the U.S.G.S. map of the same area. However, it is "reconstructed" to show the writer's theory of the effects of very recent tilting, and is presented as an example of the type of study which should precede every location made in this part of Utah. Only information which has been published by the U.S.G.S. is presented, although the writer in some instances gives his own interpretation of it, based on his own field studies.

The difference in contouring of the two maps of the same area is this: the U.S.G.S. map shows the structure as it now is, while that by the writer shows it as it was until very recent time. This means that any oil field which might exist there would have a slightly inclined oil-water contact, of about 1°, toward the north.

Most of the fields in the Rocky Mountain region show some results of recent tilting in their oil-water contact, especially Lance Creek, in eastern Wyoming, and Grass Creek, in the Big Horn basin. That this tilting is recent and there has been little time for any adjustment by the oil body, if time should be a factor, is indicated by Baker's observations of inclined gravel terraces of very recent age. On pages 92 and 93 of U.S.G.S. Bulletin 951 he describes a series of terraces extending southward from the mouth of the San Rafael River for a distance of 31 miles and with a uniform rise southward of 1,800 ft. This is at the rate of 58 ft. per mile, and represents only one stage of movement. Also, it is even more recent than the late Tertiary sinking of the Uinta basin which was referred to in an earlier paragraph.

That there has been more tilting than the 53 ft. per mile shown by the terraces is indicated by the elevation where the Shinarump sand lenses out. It is missing on the axis of the anticline north of Cane Creek, but extends well up on the west flank of the fold. It should also be noted that this formation is also missing at lower actual elevations, in the tributary streams, Mineral Canyon, Hell Roaring Canyon, and Spring Canyon, which cut into the anticline. It is not exposed to the north, but data as to the location of the pinch out are supplied by the logs of the Marland and Glen Ruby wells just north of the Little Grand fault. Assuming that the elevations of the "pinchouts" were on the same planes until the recent tilting took place, it requires a retilting, back to the south of approximately 100 ft. per mile to place the structure in the position which it occupied when accumulation took place.

Answer to Garn's Oil Seep

The two wells above referred to, in addition to supplying structural information, also provide the answer to the problem of the famous Garn's oil seep which is located along the fault, southeast of the Marland well. This well was drilled jointly by Marland Oil Co. and Mid-West Refining Co. on the recommendation of the writer. It was his opinion, at that time, that the oil seep came from an accumulation of oil caused by, and downdip from the fault. The well encountered oil in the top of the Shinarump sand and bailed oil at the rate of 3 bbl. per hour. When it was deepened the lower half of the 25-ft. sand was found to be water bearing. Drilling was continued through and below the Moenkopi, which to the south, in the Green River Canyon, carries some oil-saturated sands, but no more shows of any importance were found. Several years later the writer and a few associates drilled what is known as the Glen Ruby well. This well was located 140 ft. higher, structurally, than the Marland well and it was believed that the whole thickness of the Shinarump would be oil bearing. This formation was entirely missing, however, and in order to be sure that it was not due to faulting, the well was continued to the Kaibab, which was found at normal depth.

While this history of these two wells

may not at first glance appear important, they have considerable significance in providing clews to the seepages. It is now apparent that the Little Grand fault occurred too late to trap any oil, otherwise some of the Moenkopi sands should have been oil bearing. It is also significant that Garn's seep and the saturation along Little Grand fault do not occur opposite the high point of the structure nor is there any evidence of saturation along the fault west of Green River. It must be inferred that the fault cut through an accumulation of oil in the Shinarump which was caused by the pinching out, updip, of this sandstone. There is no evidence that the fault was responsible for any accumulation.

Five miles southeast of Garn's seep is considerable evidence that oil has escaped along another fault, known as the Salt Wash fault. This is described by McKnight in U.S.G.S. Bulletin 908. On page 132 he describes the drilling of wells, years ago: "in an attempt to cut one of the Salt Wash sandstones of the Morrison, which is partly saturated with petroleum at its outcrop in the cliff 1,700 ft. southwest of the well."

Old Oil Seepage

Near the northeast corner of 3-17e-22s and on the north bank of the creek is an old seepage (not mentioned by McKnight) where oil once escaped and saturated a small area of loose "blow sand" into a pavement-like mass. There is no reason to believe that the Salt Wash fault occurred at an earlier age than the Little Grand fault, which still leaves the problem of the origin of the oil which caused the saturation and seep just referred to. Undoubtedly, it escaped from an accumulation not caused by the fault. Furthermore, it is not likely that the upper edge of the Shinarump sand lens comes near to the fault in the vicinity of the most saturation. It is only when the Big Flat anticline is tilted back to the south, at the rate of 100 ft. per mile, that it becomes apparent that this fault either cuts across a pool in a smaller anticline or is a part of a larger accumulation which includes, as an edge well, the 1 Cane Creek well. Both the 1 Cane Creek and the Shafer Dome wells failed to find any oil. In the opinion of the writer they are both below the 2,800-ft. contour on the reconstructed map. The 1 Cane Creek well is just above the 2,900-ft. contour.

Thus, it is not improbable that a large oil accumulation extends from this well some 35 miles to the northwest, where the Salt Wash fault system cut across it and permitted some of the oil to escape upward and saturate overlying beds in the same manner as is found in Baldwin Hills (Inglewood) field in California, where oil is produced both from the upper beds as well as the lower ones, which provided the accumulation of oil before the faulting permitted its upward migration.

Clues to Age of Folding

While the reconstructed may shows only the closure on the Wingate, there is an important amount below this datum bed which can be mapped in the south and southeastern part of the structure. The unconformities in these lower beds also give important clues to the age of the folding; an element of vital importance in oil prospecting. While McKnight fails to recognize the doming in the vicinity of the Cane Creek wells as due to salt flowage, in the succeeding paragraph, regarding the neighboring Shafer dome, he states that: "It is possible that the Shafer dome may have been formed, in part at least, by plastic movements of salt in the Paradox formation in response to lightened load brought about by erosion of the stratigraphic overburden along the Colorado River." This writer believes that **all** of the doming (closure) in both the Cane Creek and Shafer "domes" is due to salt flowage. However, in his description of the Cane Creek anticline, (Bull. 908, page 118) McKnight observes that: "the Cane Creek anticline was formed early in the geologic history of the region and has been accentuated by folding at several subsequent times.

"The earliest folding of which we have record occurred between the Cutler (Permian) and Moenkopi epochs of deposition. Another warping occurred between the Moenkopi and Chinle epochs. Many of the details of still later folding have been removed by erosion over the main part of the anticline, but both on the southeast and on the northwest the ends of the anticline are recognizable in the Wingate and later formations. Northwest from the Colorado River the axis of the anticline trends about N. 45° W. for perhaps 7 miles and then swings to the west. Its southwest flank in the Wingate and later formations is very much flattened as compared to the dip in the Paleozoic formations, showing that the dip in this flank is largely of pre-Wingate and probably pre-Moenkopi date.

"Actually the earth block containing the Cane Creek anticline and Shafer dome apparently acted as a rigid structural unit during post-Wingate deformation, and the downwarping occurred on the northeast and southwest borders of this block leaving it as a broad, flat, ill-defined anticlinal area swinging off westward toward Bowknot Bend on the Green River. There appears to be a local, flat dome with a closure of perhaps 200 ft. on this anticlinal block in the vicinity of the Knoll; contours on this dome are only approximate, owing to the absence of beds at recognizable stratigraphic horizons on which altitudes could be determined."

The foregoing paragraphs by McKnight contain the key to the structure in this immediate area. When the fold is revolved back to its original form it is no longer "a broad, flat, ill-defined anticlinal area swinging off westward toward Bowknot Bend on the Green River." It becomes a fairly symmetrical anticline with the axis crossing Hell Roaring Canyon approximately 6 miles above its mouth. This is an important place, since in this same bulletin, on pages 62, 69, 73, 74, and 76, McKnight describes evidence of unconformities in the Moenkopi, Chinle, and Wingate formations, thus fairly well establishing it as the axis of the anticline. Furthermore, he describes a "closure of perhaps 200 ft. on this anticlinal block," while earlier in the same paragraph he mentions the underlying unconformities. Elsewhere in the same bulletin on pages 37 and 52 he describes thinning over the Cane Creek axis of some 500 ft. in the Cutler and Moenkopi formations. As a matter of fact the writer, as well as the geologists of Tide Water Associated Oil Co. have determined between 700 and 800 ft. of closure to the southwest from the Knoll. This is due to unconformities in the older formations and is in addition to the 1,200 ft. obtained by retilting the area.

Other Oil-Field Requisites

Regarding the other requisites for an oil field, source beds, and reservoir rocks, it appears from the evidence of oil in the region that source beds exist. Just what can be expected from the limestones, thin sandstones, and sandy limestones can only be determined by drilling. Apparently the 1 Cane Creek well found production in a 33-ft. "dark, sandy limestone." That it was capable of producing an appreciable amount is indicated by contemporaneous reports in the local newspaper. Concerning this show of oil, which was encountered at 2,028 ft., the Moab-Times-Independent, under date of October 7, 1926, has this to say of local operations: "Another string of tools will soon be pounding away on Cane Creek dome with the big productive sand at 2,028 ft. as its objective. This sand, when tapped in No. 1 well flowed by heads for weeks, in spite of heavy overriding water pressure. Repeated attempts to shut off the water to develop the oil sand met with failure, and finally it became necessary to abandon the production in this well and send the drill deeper. Estimate of the production from the first sand range from 500 to 3,000 bbl."

A deeper show was found at 3,628 ft. in a thin sandy limestone. It actually flowed between the 6¼ and 4¾-in. casing, but was finally abandoned.

The No. 2 well failed to find any significant shows, as did also the Shafer dome well, indicating they were too low structurally. The Shafer

(Continued on page 104)

QUESTIONS on TECHNOLOGY

by W. L. Nelson

Consulting Engineer

Care of Tube-Cleaning Hose

I have not before been responsible for using tube cleaners. What can you recommend regarding the care and handling of the tube cleaning hose? —F. R.

Tube-cleaning hose is expensive. In breaking the coil out of the package it should be uncoiled and stretched out on the floor to relieve strains. It should be left for a day or two, particularly if it has been packaged for a long time.

Each time that the hose is used, including when it is first used, the hose couplings should be tightened. The couplings lock the ends of the protective wire and they must have a firm grip on the end of the hose. Loose couplings are a hazard and they will chew the ends of the hose if they are not tightened.

After the hose has been used, it is stretched out to full length and blown with air to remove debris and remnants of oil. The ends should be plugged or capped to protect the threads and to keep dirt or debris out of the hose. It should be laid in as wide loops as possible on the floor, not hung or leaned against the wall. Moisture, sunlight, kinks, or heat greatly shorten the life of the hose.

When connecting the hose to the motor it should first be blown with air, and oil should be fed into the stream of air so that oil will be available immediately when the motor is started. A little oil should also be put on the motor.

Allyl Alcohol From Propylene Via Allyl Chloride

Simplified Flow Diagrams

According to Fairbairn, Chevey and Cherniavsky, "Commercial-Scale Manufacture of Allyl Chloride and Allyl Alcohol from Propylene," presented before the San Francisco regional meeting of the American Institute of Chemical Engineers, allyl alcohol is now being produced commercially by Shell Oil Co., Inc. These operations were being studied even in 1941 (E. C. Williams, Synthetic Glycerol from Petroleum, A.I. Ch.E., Vol. 37, page 157, 1941; and W. L. Nelson, The Oil and Gas Journal, February 27, 1941, page 89) as a part of a program to produce glycerol from petroleum.

Allyl chloride is the feedstock. It is made from propylene by vapor-phase chlorination at about 500° C. by the following reaction:

$$Cl_2 + CH_2 : CH . CH_3 \rightarrow CH_2 : CH . CH_2Cl + HCl$$

It is used for the manufacture of allyl bromide, cyclopropane, epichlorohydrin, glycerol, dichlorohydrin, trichloropropane, and allyl isothiocyanate as well as allyl alcohol.

The essential features or operations in allyl alcohol manufacture are:

1. Deaeration of the incoming 20 per cent caustic solution by means of steam.

2. Hydrolysis of the chloride into alcohol as follows:

$$CH_2 : CH . CH_2Cl + NaOh \rightarrow CH_2 : CH . CH_2OH + NaCl$$

The hydrolyzer operates at 150° C., and at about 200 psig. The pH is kept between 10 and 12.

3. Allyl alcohol forms an azeotropic mixture with water.

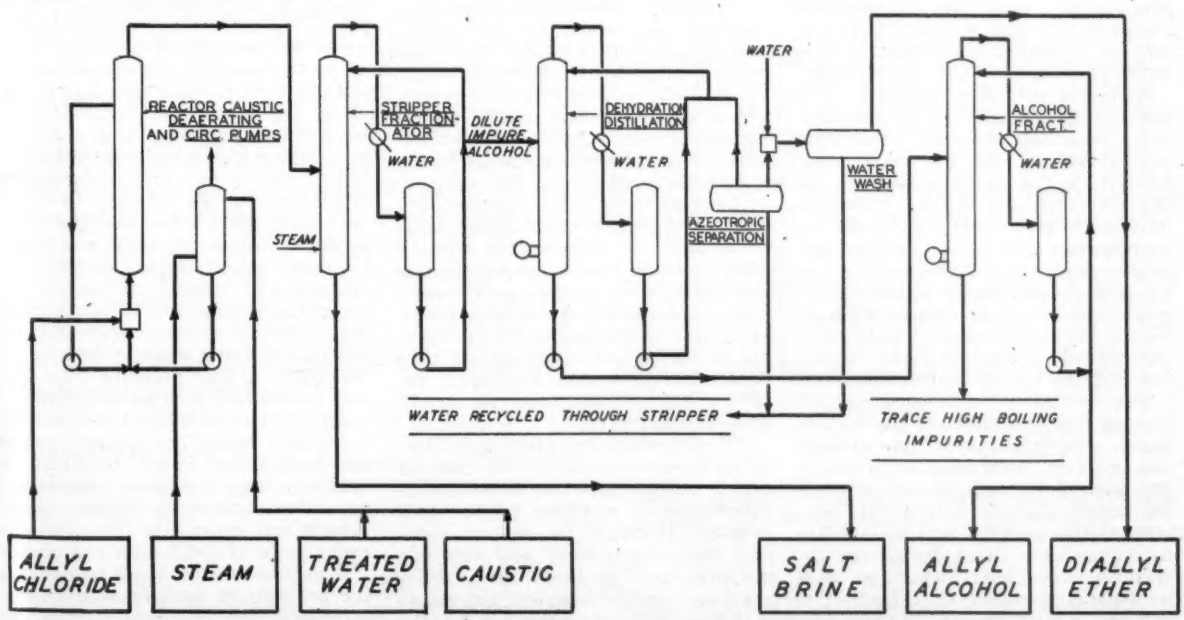
4. The alcohol-water azeotrope is stripped from the extra water, the salt, and small amounts of caustic and allyl alcohol.

5. The azeotrope of alcohol and water tends to distill in the dehydration column, but it is separated to some extent from the water as it meets a solution of diethyl ether (and some alcohol) near the top of the column.

6. Any azeotrope that distills overhead is separated by mixing it with diallyl ether which drops out a layer which is mainly water. Thus, water is currently eliminated at the top of the dehydrator and impure allyl alcohol is separated by fractionation from the bottom of the hydrator.

7. The small production of diallyl ether is washed with water to remove any allyl alcohol, and this water along with that mentioned in Item 6 is recycled through the stripper to recover traces of allyl alcohol and diallyl ether.

8. Minor amounts of high-boiling impurities are removed in the alcohol fractionator.



Simplified flow diagram of manufacture of allyl alcohol via allyl chloride

SOME HIGH POINTS IN *Gasoline Plant Design*

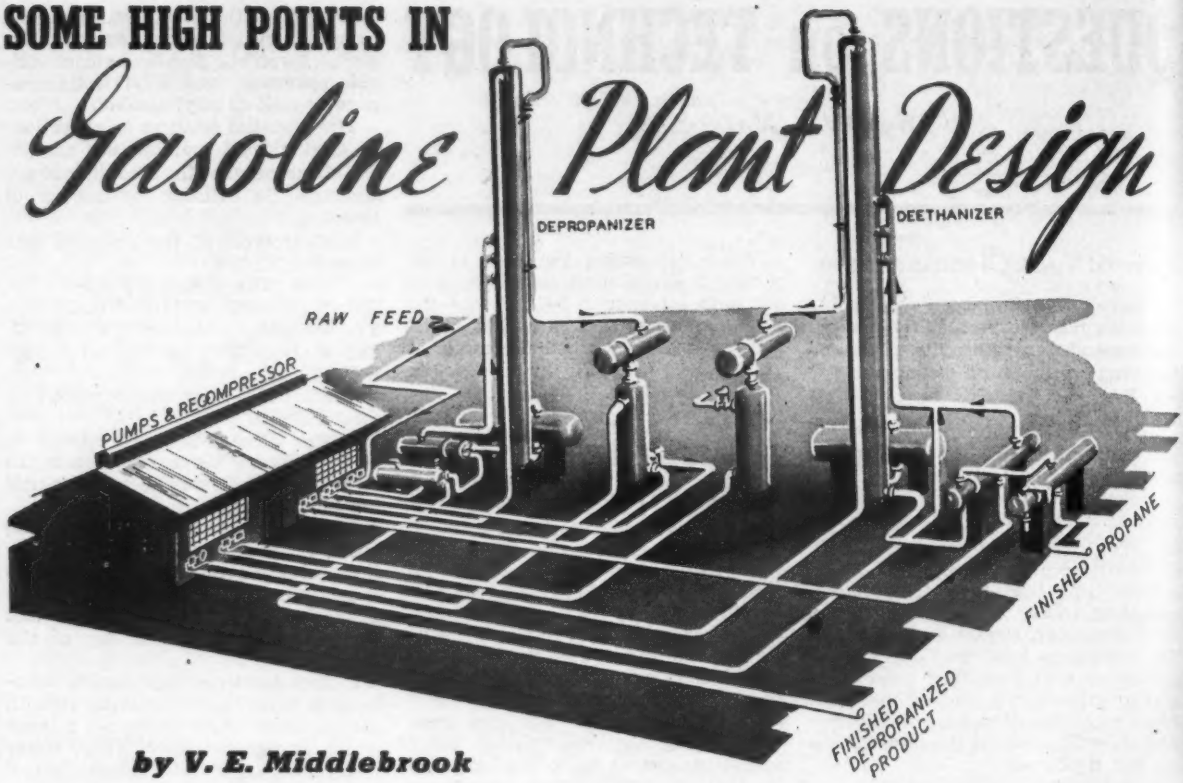


Fig. 1—It is often economically attractive to recover propane by continuing to operate an existing low-pressure column as a depropanizer and feeding a small deethanizer column both the liquid and vapor overhead from the depropanizer. The noncondensable vapor must be recompressed to the pressure required for feeding the deethanizer column

by V. E. Middlebrook

This article dealing with gasoline plant design and another to follow on cycling plants have been prepared for the Journal by V. E. Middlebrook from his original discussion of the subject given before a meeting of the Tulsa group of the American Institute of Chemical Engineers last year. The author is manager of the gas-gasoline department Tulsa area, Shell Oil Co., Inc.

WORLD WAR II marked the advent of concerted efforts to recover high percentages of butane and propane, and in many ways revealed new process and mechanical design techniques which, prior to that time, were considered to be of a more or less esoteric nature. Contrary to popular expectations termination of hostilities failed to curtail the demand for these products although no doubt smaller amounts of normal butane are currently being used for dehydrogenation to butadiene, and of course smaller quantities of isobutane for alkylation with butylene to isooctane.

Liquefied petroleum gas sales (butanes and propane) have increased more than 300 per cent during the period 1941 to 1946, the trend being toward the use of more propane for domestic fuel, and the use of butane in various motor-fuel blends due to its relatively high octane number and lead-susceptibility characteristics. In view of these facts it seems appropriate and timely to review the high points in plant design which have contributed to the successful recovery of these lighter hydrocarbons.

Due to the rather complex behavior of the hydrocarbons the factors which affect plant design are numerous and very often difficult to evaluate from the standpoint of over-all economics. Indeed, within the purview of this paper it will be possible to discuss only those design considerations which lend themselves well to general discourse in the absence of specific mathematical illustrations.

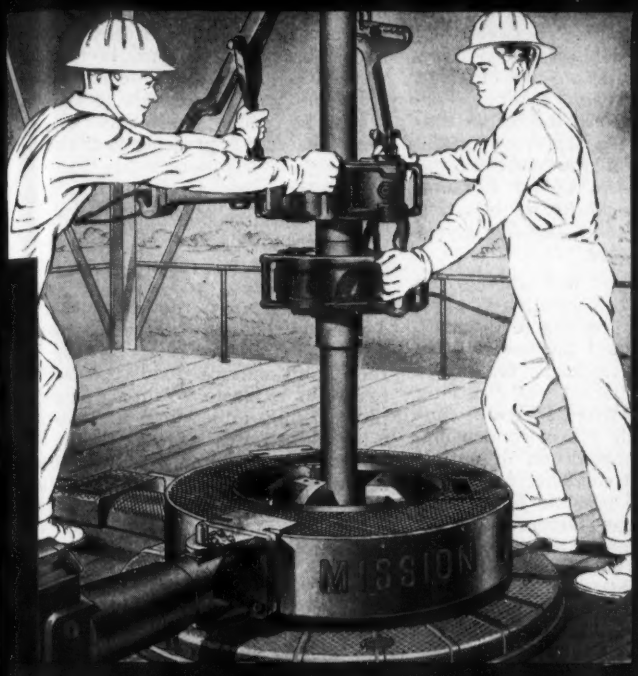
The raw materials processed in natural-gasoline plants are, generally speaking, the lighter or gaseous hydrocarbons produced from oil or gas wells. Casing-head gas is that produced along with substantial quantities of crude oil, and strictly speaking comes from a formation which is indigenous to the oil stratum. Dry gas is that produced from a gas reservoir or from a formation containing such small amounts of oil that by legal definition it is so classified. Cycling plants process hydrocarbon materials produced from single-phase reservoirs or the so-called distillate fields. (This type of formation and the manner in which the materials are produced and processed for liquid recovery will be discussed separately in a later paper.)

The gas remaining after liquid hydrocarbons have been extracted is called residue gas and is composed principally of methane, ethane, and propane. It might be well to mention that casing-head and dry gas normally are produced from much shallower wells than are the products from distillate reservoirs.

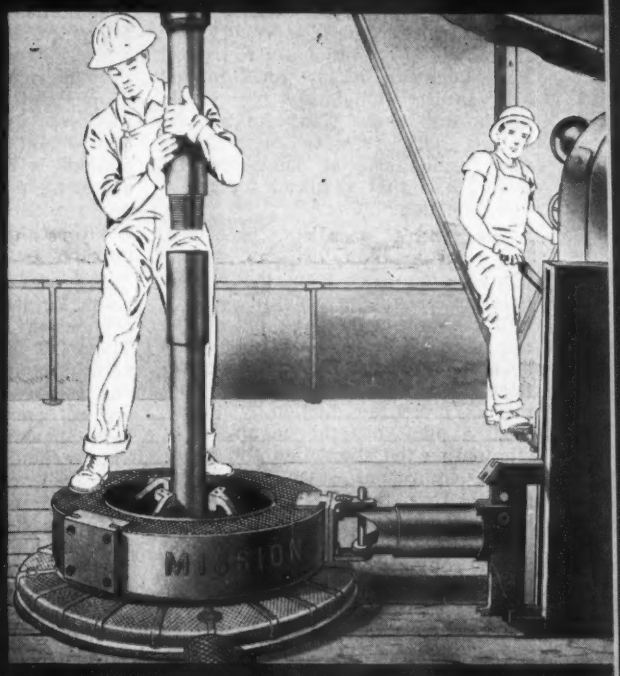
The disposition of plant residue gas is usually one of the most important factors affecting plant design. If the residue is to be sold to a utility company, the sale pressure often establishes the absorption pressure. This, of course, is not always true since it is sometimes more economical to operate the absorption equipment at some lower pressure, and compress the residue gas remaining after liquid extraction and fuel requirements to the desired sale pressure. Obviously this procedure reduces the compressor-horsepower requirements. However, where high recoveries of propane and butane are desired, the saving in horsepower is often more than offset by reduced absorption-oil circulation rates when absorbing at the higher or sale pressure. That this may be the case is apparent when we consider the fact that oil rate largely establishes boiler horsepower, pumping horsepower, water requirements, heat-exchanger surface, dephlegmator reflux condensing surface, size of vessels, and in fact, the size of almost every piece of distillation equipment.

If pressure maintenance is involved the problem of most economical absorption pressure is again important.

(Continued on page 102)



Here the Slips are shown in lowered or engaged position for making up or breaking out a stand of pipe



Showing how it lifts the rotary, thereby shielding the workmen from the revolving parts and rotary

INCREASED EFFICIENCY: When hand slips are used, round trips are the toughest, most back-breaking work the men do. MISSION Power Slips relieve the men of this gruelling labor, keep them fresh through the tour. The slips are highly efficient in operation. They swing to position like tongs, without the aid of a catline. Pressure of the driller's foot on a pedal lowers the slips smoothly and quickly, to grip the pipe. Another foot pressure raises and releases the slips.

INCREASED SAFETY: Manual handling of slips has been a leading cause of accidents. MISSION Power Slips reduce the chance of accidents to a minimum. Men are protected from moving parts by the stationary lifting ring, on which they can even stand while rotary is spinning.

INSTANT AVAILABILITY: MISSION Power Slips are always ready for instant use.

AMPLE CLEARANCE: Opening when slips are in raised position is ample to pass tool joints, pipe protectors, tubing catchers, etc.

ALL SIZES OF PIPE are handled, from 2⅜" to 7". Change to a different size of slips or dogs is easily and quickly made.

QUICKLY INSTALLED WITHOUT INTERRUPTING DRILLING: MISSION Power Slips are quickly installed without interrupting or interfering with drilling operations. Operating post is bolted to a foundation beam and compressed air connection made. Operates on 2½ cu. ft. of free air per minute, but 4 cu. ft. compressor recommended to allow for wear.

ELIMINATION OF WEAR: When pipe is spinning, slips are not in contact with lifting ring, eliminating wear on rollers.

SIMPLICITY OF DESIGN, best materials, few parts, and accessibility insure trouble-free operation.

MISSION GUARANTEES proper mechanical performance, materials and workmanship. Before you buy power slips, insist on seeing the MISSION "Super-Speed!"

MISSION MANUFACTURING CO., HOUSTON 14, TEXAS
Export Office: 30 Rockefeller Plaza, New York 20, N. Y.

Mission "Super Speed" POWER SLIPS

. . . have a *mission* . . . to save you money!

However, with high reservoir injection pressures it would appear that it is usually more economical to operate the absorber at some lower pressure and then recompress the remaining residue to the desired injection pressure. This is especially true if the gas is exceptionally rich or if large quantities of low pressure fuel are required. Obviously this would be the case if the plant situation involved both pressure maintenance and residue sale at some pressure lower than that required for reservoir injection.

The type of gas being processed, i.e., rich, medium, or lean, affects plant design more from the process point of view. For example, a very rich gas, low in methane and ethane can often be processed to advantage by a combination of compression, refrigeration, and stage flashing (isothermal pressure reduction by stages). Such a plant has the advantage of eliminating the absorption and distillation equipment since the liquid product from the final stage flash is fed directly to the fractionating equipment. When the methane and ethane contents of the rich gas are as low as 50 and 15 per cent respectively, it is interesting to note that the order of magnitude of recoveries using this process can be as high as 85 per cent of the total butanes, and 95 per cent of the isopentane and heavier constituents. These recoveries can be realized by compressing the gas to 300-350 psi. and refrigerating to zero to plus 15° F. The intelligent selection of such a process presupposes that the gas will not become leaner as the reservoir is depleted. It follows, therefore, that usually it is not advisable to employ this means of recovery where pressure maintenance is involved since the increase in methane and ethane content of the incoming gas ultimately reduces the recovery efficiency to an untenable point, and absorption equipment must be installed.

Rich in Heavier Hydrocarbons

In rare cases the inlet gas is sufficiently rich in the heavier hydrocarbons, and of course, correspondingly deficient in the lighter constituents, to effect attractive recoveries by vapor rectification. This process involves feeding the incoming rich gas to a fractionating column and is limited only by the ability to reach the dew point of the overhead mixture for reflux condensing at a pressure consistent with sound economics, and below the critical point.

Prior to the time of high butane recoveries reflux condensing in such plants usually was accomplished with ordinary water cooling, and it was possible to recover substantially all the isopentane and heavier fractions. Later, by refrigerating the overhead product from the same vapor rectification columns to about 40° F. column top temperatures were maintained at about 60° to 70° F., and practically all the butanes were recovered. Now that the propane market is quite strong some of these units are being refrigerated further to obtain 30° to 35° F. reflux with top temperatures ranging between 50° and 60° F. Under these conditions propane recoveries on the order of 35 per cent are being realized. Formation of hydrates in the reflux condenser and on the top trays of the column is one of the more vexing operating problems, but it is being coped with successfully by injecting small amounts of diethylene glycol into the column feed.

The availability and quality of water influence the selection of plant condensing and cooling equipment. The trend is toward the use of more aerial-type units especially for engine and compressor jacket-water cooling service, excess exhaust steam condensing, and still reflux condensing. The economic application of aerial-type coolers and condensers to these services is made possible by the relatively high mean temperature difference obtainable which counteracts the inherently low over-all heat-transfer rates obtained by vapor to air or liquid to air heat exchange, thereby keeping the total surface requirements to a minimum.

It follows, therefore, that the quality of cooling water would have to be very poor and the cost to obtain it exceptionally high to justify the use of aerial equipment on fractionator reflux condensing service where selected operating pressures dictate relatively low top temperatures (120° to 140° F.). However, the application of air-cooling equipment to such services is being studied extensively, and it is possible that column operating pressures will, in some cases in the future, be raised sufficiently to permit the higher top temperatures necessary for attractive m.t.d.'s. Further, a limited amount of aerial cooling at the high temperature level, supplemented by water cooling to obtain final low temperature, may be attractive.

Geographical location, wet-bulb temperature, and wind velocity all have their influence on plant design, and selection of the individual pieces of equipment. Where wet-bulb temperatures are high and wind velocities low, induced-draft water-cooling towers have been used extensively. Indeed, there is now a strong tendency toward the use of induced-draft towers in any event, since it is rather generally conceded that additional investment will be paid out in a reasonable length of time, and increased operating expense justified, due to periods of low wind velocity.

Generally speaking, recovery efficiencies in existing plants can be improved by any one or any combination of the following fundamental approaches: Increased absorption oil circulation; increased absorption pressure; reduction in average absorption temperature by refrigeration of the absorption oil, refrigeration of the gas or both; reduction in the molecular weight of the lean oil. It is obvious from the foregoing that the primary consideration in any hydrocarbon-recovery problem is that of absorbing the various constituents from the gas. Since this is true it might be well to compare briefly these different approaches to the same problem.

Increasing the oil-circulation rate usually requires not only additional equipment in parallel or series with existing units but often the replacement of large vessels. To be more specific, it requires the installation of additional boilers, heat exchangers, preheaters, coolers, etc., (which by their unit nature lend themselves easily to extensions) to supplement the existing units, and in addition often necessitates replacement of absorbers, stills, dephlegmators, pumping units, etc., which are too small for the new load requirements and which cannot be paralleled economically.

For a given absorber pressure usually more of the undesirable constituents (methane and ethane) will be absorbed by increasing the oil circulation to obtain a given percentage extraction of the key component than would be absorbed if the same job were accomplished by refrigeration. In other words, refrigeration generally effects more selective absorption, and thereby simplifies the handling of the noncondensable vapors which is always the paramount process problem when designing for high butane and propane recoveries. This results from the fact that the equilibrium constants for propane and the heavier constituents decrease more abruptly as temperatures decrease than do those for methane and ethane.

Increasing the absorption pressure usually requires the installation of considerable additional compressor horsepower which, being moving rather than stationary equipment, makes for high operating cost. Further, even greater amounts of methane and ethane are absorbed than would be for corresponding recoveries either by increased oil circulation or by refrigeration.

For high propane recovery application of some degree and type of refrigeration seems to be the most economical approach. It is sometimes accomplished by chilling both the gas and the lean oil prior to their entrance into the absorber. In many cases, intertray chilling of the partially enriched absorption oil gives splendid results, and has the advantage of being more effective by removing additional heat (latent heat of absorption) and at a more favorable m.t.d. As has been stated above, refrigeration permits more selective absorption than either increased oil

circulation or increased absorption pressure.

Reduction in the molecular weight of the lean oil simply increases the molal oil to gas ratio which is equivalent to increasing the rate of lean-oil circulation, but without having to install additional equipment. Needless to say, the range of permissible reduction is narrow and the possible benefits therefore quite limited.

Most modern plants are designed for high butane and propane recovery; i.e., some 90 to 95 per cent total butanes, and 45 to 60 per cent propane recovery. Ordinarily the most economical absorption pressure will range between 180 and 500 psi. where cycling is not involved. However, absorption pressures as high as 500 to 800 psi. have been used where other considerations such as residue-gas sale, pressure maintenance, or repressuring requirements were influencing factors. In this connection, it is well to remember that as the absorption pressure increases, the latent heat of absorption of the individual components decreases, approaching zero as the critical point is approached. Thus it is significant that intertray cooling is never used where absorption pressures range between 1,200 and 1,500 psi. such as in cycling operations.

Use of Direct-Fired Heaters

Direct-fired heaters are being used extensively for heating the rich oil prior to its entrance into the still. In this manner higher still-bottom temperatures are attained than would be feasible with steam heating. Further, with increased propane and butane recoveries it is often necessary to carry still pressures as high as 80 to 100 psi. in order to reduce the quantity of noncondensable or recycle vapors to be processed. At such still pressures untenable amounts of partial pressure stripping steam would be required were it not for the high still-bottom temperatures attainable with direct-fired heaters. This of course would necessitate more still reflux condensing surface and pumping and cooling tower equipment. The still bottom temperature ordinarily ranges between 450° and 500° F. being limited by the temperature at which the absorption oil begins to crack. The direct-fired heater contributes to higher over-all thermal efficiencies which cannot be disregarded now that residue gas is so valuable as domestic fuel.

Although both exhaust and live steam are used extensively for still stripping, the well-designed plant more often employs exhaust steam thus being able to attain a higher over-all thermal efficiency. Indeed, it is now possible, in some plant situations, by carefully selecting mechanical equipment, to design a plant so there will be no waste exhaust steam. This is often the case where large quantities of exhaust steam can be used for reboiler service on fractionating columns employing low bottom temperatures.

Recycling for L.P.G. Recovery

As has been stated previously, the most difficult problem in any process cycle designed for high butane and propane recovery is the method of handling the recycle or noncondensable vapors. The recycle stream is composed largely of methane, ethane, and propane with of course smaller amounts of each of the heavier constituents through heptane. It is first encountered at the raw make tank into which all the overhead product from the still is delivered, percentage condensation usually ranging between 40 and 60 depending upon still operating pressure, whether or not dual stills are used, etc. If dual stills are employed the primary unit is usually operated between 125 and 200 psi., and sufficient lighter constituents are removed overhead to permit the secondary still to operate totally condensing at some 40 to 60 psi. This is accomplished by feeding the partially denuded oil from the base of the first still into the secondary unit for final stripping. In such cases all the recycle vapor is taken from the primary-still raw make tank. It is processed either by recompression, reabsorption, or a combination of the two, the idea being to eliminate as much methane and ethane as possible while retaining the bulk of the propane and heavier constituents.

Recompressed vapors may be fed hot directly to the primary fractionating column or they may be compressed to a pressure sufficiently high to obtain almost total condensation with water cooling, and then fed as a liquid, the remaining small quantitl of noncondensable vapor either being delivered into the residue-gas stream or further processed in case sizable quantities of the heavier components remain.

Reabsorbers operating at pressures ranging between 40 and 125 psi. are used extensively for processing recycle vapors in natural-gasoline plants. They are also used in cycling plants but operate over a much wider pressure range. Since the recycle stream is usually quite rich in propane, intertray cooling is often required to prevent excessive temperature rise of the rich oil when high propane recovery is desired. In other words, instead of offsetting the temperature rise by increasing the oil rate to the reabsorber, intertray coolers are used. It is the writer's opinion that it is nearly always economically sound to employ some degree of intertray cooling in low-pressure reabsorbers. Whether or not it should be accomplished by simple water cooling or by refrigeration depends largely on the percentage propane recovery desired.

The most economical arrangement of fractionating equipment is a specific problem for each plant situation depending principally on the products to be recovered. In this paper fractionating will be discussed principally from the standpoint of propane recovery. In the case of old low-pressure (45-70 psi.) plants where gas volumes have declined sufficiently to obtain high oil to gas ratios for primary absorption, the problem becomes one of using the existing fractionating equipment to best advantage. Old plants seldom have depropanizers adequate for operating pressures in excess of 250 psi. This means that it is usually impossible to operate the column totally condensing due to the large amounts of methane and ethane in the overhead with the propane. In such cases it is often economically attractive to recover the propane by continuing to operate the existing column as a depropanizer and feeding a small deethanizer column both the liquid and vapor overhead from the depropanizer. Of course, the noncondensable vapor must be recompressed to the pressure required for feeding the deethanizer column—say 425 to 475 psi. (see Fig. 1).

However, in old plants there is usually compressor capacity available to handle the volume. Actually, the quantity is so small normally that existing compressor cylinders—however small—must be converted to single-acting units by removing the crank end intake valves. Further, as a practical matter the large cylinder is advantageous since it can be equipped with clearance volume so that the compression ratio will give a vapor discharge temperature which, when the vapor is combined with the liquid feed, produces the desired deethanizer column feed temperature.

Deethanizing Raw Gasoline

It is often considered good design practice in new plants to deethanize the entire raw make, feeding the bottom product to columns operating at successively lower pressures to obtain desired final products. If the raw product has been extracted from sour gas this arrangement has the advantage of eliminating most of the hydrogen sulfide (but not mercaptans) early in the fractionating cycle, and of course reduces treating costs. Further, it precludes the necessity for operating a recompressor as in the case where the feed is first depropanized. However, a more precise job of fractionation must be accomplished since the percentage ethane contamination of the bottom product must be considerably less than could be allowed by depropanizing first and then deethanizing the smaller volume of tricomponent feed. The reason for this lies in the fact that the quantity of ethane in the finished propane would make it

INCREASE PRODUCTION
Clean Out With
MILLER

SAND PUMPS

Pump O. D. sizes are: 2½, 3, 3½, 4¼, 5, 5½ and 7 inches. 20, 25 and 30 ft. length. Strong bail welded to heavy seamless steel tube. Heavy grooved plunger assures liquid seal. Wire line direct connected to plunger for great suction.

MILLER BAILERS

Bailer O. D. sizes are: 3, 3½, 4¼, 5 and 5½ inches. 20, 25 and 30 ft. length.

Miller Sand Pump Co.
General Office Box 4516
1524 SE 29th St.
OKLAHOMA CITY 9, OKLA.

EXPORT OFFICE
30 Rockefeller Plaza
NEW YORK CITY 20, N. Y.

See Composite Catalog Page 2426

KLEEN-A-WELL
for Oil and Gas Wells

★QUICK ★INEXPENSIVE

New non-explosive, non-inflammable solvent, KLEEN-A-WELL removes paraffin and asphaltum from oil wells, gypsum and salt from gas wells. 1 shot (60 lbs. in 6-gal. container) usually sufficient to treat average depth well, depending on condition.

Write or wire

THE SULLIVAN COMPANY
Oil Drilling Compounds
Memphis 2, Tenn.
"A Sulco Product"

impossible to obtain specification product. For the foregoing reasons deethanizing the raw feed requires more expensive fractionating equipment.

Requirement in both foregoing cases is the same; i.e., to operate the deethanizer column at a pressure sufficiently high to condense a methane, ethane reflux with the aid of as little propane as possible. The pressure is limited by the critical point of the overhead hydrocarbon mixture when deethanizing the tricomponent feed, and by the critical temperature of the bottoms when feeding the entire raw product. The reflux is normally condensed by ordinary water cooling in which case the overhead product will of necessity contain from 30 to 50 per cent propane (depending on the per cent methane and ethane in the mixture) in order to reach the dew point. Where large quantities of propane are involved it is sound economy to refrigerate the top of the column, thus being able to condense a reflux which is substantially ethane, and which of course reduces loss of propane overhead.

Aside from the foregoing considerations relative to fractionating techniques for propane recovery, it is well to remember that most economical results are obtained when operating any fractionating column at the lowest pressure consistent with ability to condense reflux. The reason for this lies in the fact that the vapor pressures of the individual hydrocarbons tend to converge as the total pressure is increased. Thus it becomes more difficult to "cut" between components having their boiling points closer together, and either a greater reflux ratio or more trays are required to obtain the desired purity of products.

Oil Prospects in Utah

(Continued from page 96)

dome well was drilled to 5,863 ft. and penetrated all the Paradox formation as well as 173 ft. of underlying Molas (Pennsylvanian) shales. The total thickness of the Paradox, measured from the top of the first salt, was 4,070 ft. Allowing for thickening due to salt flowage, the Paradox should not exceed 3,500 ft. in thickness on top of the Big Flat anticline.

The underlying Molas formation is not exposed in the region, but according to Baker (Bull. 951, page 25) it should not be very thick. He states: "In the San Juan Mountains of Colorado the Hermosa formation rests upon the **thin** Molas formation, also of Pennsylvanian age, and the Molas rests upon an erosional unconformity cut into the underlying Leadville formation, which is of lower Mississippian age. Conglomerate that crops out at two localities in Salt Valley, Utah, has lithology similar to conglomerate beds in the Molas formation and probably has an analogous stratigraphic position, but its relation to the Paradox formation is obscure because of complicated structure and incomplete exposures; the outcrops may represent isolated blocks of underlying floor carried upward during the flowage movement of the plastic Paradox rocks."

The Salt Valley to which Baker refers is a badly faulted anticline, with a salt core, some 18 miles northeast of the Big Flat anticline. The nature of the Mississippian rocks which underlie the Molas, and which can reasonably be expected to be present under the Big Flat-Salt Wash structure cannot be accurately determined. There are no outcrops in the region, and the nearest well which drilled this section is located on the Monument upwarp, some 50 miles south of Big Flat. Baker reports that this well drilled more than 2,400 ft. of beds below a formation which he correlates with the Paradox. This section included black shale, black limestone, and sandstone. He also believes that the Phillips well, drilled on the Spur, 20 miles west of the Big Flat, drilled an anhydrite section corresponding to the Paradox and then penetrated 400 ft. of dolomite that might represent the Mississippian. This well was not only located on a small structure of very little closure, but, like the Monument upwarp was one of the structures referred to by Baker as having been made by post-Cretaceous movements.

Some 60 miles to the northwest California Co. drilled some 3,000 ft. of beds below recognizable strata of Pennsylvanian age before encountering granite. This section was predominantly dolomite.

An adequate test is assured for the Big Flat-Salt Wash anticline by a well to be drilled by the Tide Water Associated Oil Co. on a block centering in the northeast quarter of Township 26s, Range 19e (unsurveyed). It should encounter the top of the Paradox formation at about 3,500 ft. and be through that formation at 7,000 ft. or less. A total depth of 10,000 ft. should also make an adequate test of the underlying Mississippian limestones and dolomites.

On the north end of the anticline, in the vicinity of Salt Wash, Pacific Western Oil Co. is assembling a block for a test.

It is also reported that Amerada Petroleum Corp. is making plans for a deep test on the same anticline, north of the Little Grand fault. This was previously drilled by Marland Oil Co. but failed to reach the Hermosa or the underlying Paradox.

Reference

"Peculiar Phases of Oil Saturation in Certain Sandstones" by Glen M. Ruby. Bull. A.A.P.G., Sept.-Oct. 1923, Vol. 7, No. 5, p. 473.

MODERN Rotary DRILLING

Rotary-Bit Performance

OF the factors affecting the performance of the bit the basic one is that of the type of formation drilled. This factor is of course beyond the control of the operator. The only way the requirements imposed may be met is by studying the formation's characteristics and using the bit best adapted to conditions. Factors under control of the operators are the characteristics and the volume of the mud used, the speed of rotation, and weight on the bit.

Formations Drilled

Studies of characteristics of formations drilled, having as their purpose improvement of rate of penetration and of life of bits, are of particular importance in case of hard formations drilled with rock bits. Extremely short life of bits in drilling of certain formations, such as dolomite or chert, is one of the most important elements affecting the economics of present-day deep-well drilling. Application of the results of these and other studies, in the last few years have resulted in considerable improvement in the per-bit footage in this type of drilling.

In analyzing the performance of rock bits in drilling of hard formations two meanings of the word "rock hardness" have to be considered.[1] One is the rock's resistance to penetration. This characteristic is a function of the crushing strength of the rock. The other is the ability of the rock to cause wear, that is, the abrasive characteristics of the rock. It is the combination of these two characteristics which result in the problem of drilling difficulties.

Exhaustive laboratory experiments are conducted by rock-bit manufacturers to arrive at some estimates of life expectancy of their bits in different types of formations and under different combinations of the controllable drilling variables. As a result of these experiments the manufacturers are in position to give broad recommendations in regard to weights and speeds to be used in different formations. These recommendations cannot be specific, because of inability of duplicating of field conditions in the laboratory. They do form, however, the best and safest general norm to be followed for most satisfactory results.

The experiments are performed with special small bits, used on tests of small rock samples, or with stock bits. The drilling machines used are capable of wide variation in weights on bits, speeds of rotation, and volumes of circulation. Chart in Fig. 59 shows the results of one of such investigation.[1]

Data for the tests, results of which are presented in the chart, were secured by use of a sharp, full-size bit. They present the correlation between the "drillability" of different rocks and their crushing strengths. For the purposes of this investigation drillability of a rock was defined as the ratio of the rate of penetration in feet per hour, to the weight in pounds imposed on the bit. The crushing strengths of different rocks are known from determinations made for different industrial purposes and are not shown here. It should be stated, however, that the chart indicates close relationship between the crushing strength and the rate of penetration. If used for comparative purposes, the chart indicates the rate of penetration in different rocks for given weight on bit or the weight which must be used in drilling through different formations to secure a given rate of penetration. The data assume uniformity of the formation.

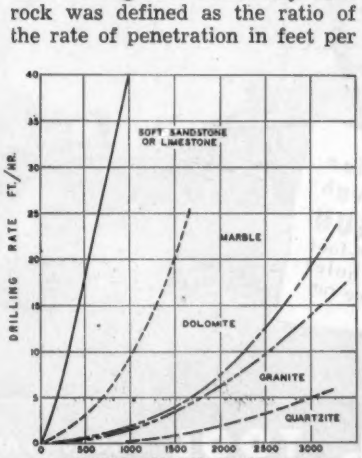


Fig. 59—Drilling rate against weight on rock bits for different formations at 60 r.p.m.[1]

Effect of Mud

As far as performance of the drilling bit is concerned, the purpose of the drilling fluid is to clean and cool the blades or the teeth of the bit, and to remove rapidly the cuttings from the bottom of the hole out of the path of the bit. Both the characteristics of the mud and the volume of circulation affect this action of the mud.

Field experience and laboratory investigations indicate that certain types of mud do slow down the rate of penetration. As a rule, however, the characteristics of the mud are determined primarily by requirements of drilling conditions and of well safety and not by those needed for proper performance of the bit. The best that can be attained is a satisfactory compromise. From the point of bit service clear water would be the most satisfactory drilling medium.

It is readily apparent that the required volume of circulation is determined by type of formation drilled and by the rate of penetration. In sticky formations, or in soft formations with rapid rate of penetration, more volume is needed to clean the blades or the teeth of the bit to remove large amounts of cuttings than in slow drilling of hard rocks. In the latter case large volumes of circulation would represent only an unnecessary waste of pumping power. Within these broad limits the actual volume of circulation needed for any specific conditions must be determined from experience and is an important factor in affecting the bit service.

Reference

1. Floyd L. Scott: "Hard Rock Rotary Drilling," The Oil and Gas Journal, October 5, 1946, p. 74.

No. 55 in a series by Joseph Zaba, petroleum engineer, Houston

10 GOOD REASONS WHY OPERATORS PREFER

McCullough
GUN PERFORATOR SERVICE

1. **MEETS EVERY CONDITION.** Guns fired either electrically or mechanically: guns run on cable, sand line, drill pipe, tubing, or on piano-wire measuring line in extremely high-pressure wells.
2. **SIMULTANEOUS FIRING** under all conditions gives exact spacing of shots, perfect perforation pattern, and saves down-the-hole time.
3. **ACCURATE DEPTH MEASUREMENTS** put the shots right where you order them.
4. **MAXIMUM PENETRATION** of bullets into the formation, as proved repeatedly in competitive field tests.
5. **GUNS TO FIT EVERY CONDITION.** McCullough employs more than 30 different types and sizes of guns.
6. **ALL SIZES OF BULLETS** from ½" dia. up to ¾" dia., to fit every possible need.
7. **BURRLESS BULLETS,** giving a completely burr-free hole, eliminating casing scraping, with *no* sacrifice of penetration.
8. **NO LOST TIME.** McCullough's simpler, lighter equipment cuts setting-up and moving-out time, speeds up every job.
9. **EXPERIENCED MEN.** With years of experience behind them, thoroughly-trained McCullough gun-perforating crews do their jobs quickly, efficiently, safely.

These Are Some of the Reasons Behind the Proven Fact That

McCullough

PUTS THE SHOTS WHERE THEY COUNT!

10 This is a section of a McCullough **90-SHOT GUN** perforating a 15-foot section with 6 holes to the foot, at one run.

McCullough TOOL COMPANY

5820 South Alameda St., Los Angeles 11, California
405 McCarty Avenue, (P. O. Box 2575) Houston, Texas

24 SERVICE LOCATIONS

TEXAS: Houston, Alice, Corpus Christi, McAllen, Odessa, Tyler, Victoria, Wichita Falls
OKLAHOMA: Oklahoma City, Guymon, Healdton
MISSISSIPPI: Laurel
NEW MEXICO: Hobbs
KANSAS: Ulysses
CALIFORNIA: Los Angeles, Avenal, Bakersfield, Sacramento, Ventura
LOUISIANA: Houma, Lake Charles, New Iberia, Shreveport
WYOMING: Casper

EXPORT OFFICE 30 Rockefeller Plaza, New York 20, N. Y.

ENGINEERING *fundamentals*

Relative Permeability Ratio

RELATIVE permeability has been defined previously (Engineering Fundamentals No. 317) as the ability of a reservoir material to conduct a given fluid at a partial saturation of that liquid referred to the ability of the same material to conduct the fluid at full saturation of the fluid. Thus, a relative permeability to oil of 0.5 denotes that at the oil saturation in question, the reservoir will conduct one-half of the quantity of oil that it would conduct under equal conditions of pressure and viscosity if it were completely saturated with oil.

It was also noted that there exists no analytical means of deducing what the relative permeability should be under given circumstances. Although general trends have been established to show qualitatively the variation of relative permeability with the degree of fluid saturation, there has not yet been established a method of deducing the quantitative variation of relative permeability with saturation.

Another useful concept which derives from the relative permeability concept is the relative (or effective) permeability ratio. This quantity lends itself more readily to analysis and to the correlation of flow performances than does relative permeability itself. The relative permeability ratio expresses the ability of a reservoir to permit flow of one fluid as related to its ability to permit flow of another fluid under the same circumstances. The two most useful permeability ratios are k_g/k_o, the relative permeability to gas with respect to that to oil and k_w/k_o, the relative permeability to water with respect to that to oil, it being understood that both quantities in the ratio are determined simultaneously on a given system. The relative permeability ratio may vary in magnitude from zero to infinity.

It has been noted in the literature that the relative permeability ratio lends itself to a simple relationship with oil saturation over a wide range of saturation values. Consider a system flowing gas and oil. At high oil saturations the flow of gas is zero, k_g is zero, and hence k_g/k_o is zero. As the gas saturation increases, k_g increases but k_o decreases and, therefore, k_g/k_o increases. When the oil saturation becomes sufficiently low, k_o approaches zero and the value of k_g/k_o approaches infinity. Fortunately, the form of the variation of k_g/k_o as saturation decreases is fairly regular in character over a wide range of conditions. Fig. 1 is a typical plot of k_g/k_o versus the liquid (or oil) saturation. Those who advanced the concept of relative permeability noted that k_g/k_o plotted against saturation on semilog paper as in Fig. 2 to give linearity over a wide range of saturations. The complete form of a typical semilog relationship is shown. It has become common usage to express the central straight-line portion of the relationship in the analytical form

$$k_g/k^\circ = a\ e^{-bS_o} \qquad (1)$$

or, $$\log k_g/k_o = \log a^{-bS_o} \qquad (2)$$

where S_o is the oil saturation (equal to one minus the gas saturation) and a and b are constants characteristic only of a given reservoir material and a given set of fluids. Slope of the linear plot in Fig. 2 is denoted by b.

The use of this analytical expression has been justified in view of agreement between theoretical relationships which may be deduced from it and actual observed data. Many examples of experimentally determined relationships which adhere to this basic concept are available in the literature. The range of saturations over which Equations 1 and 2 hold is the range of gas saturations within which a large share of petroleum production occurs. Their use gives expression to the quantity of gas which may be required to produce a given quantity of oil.

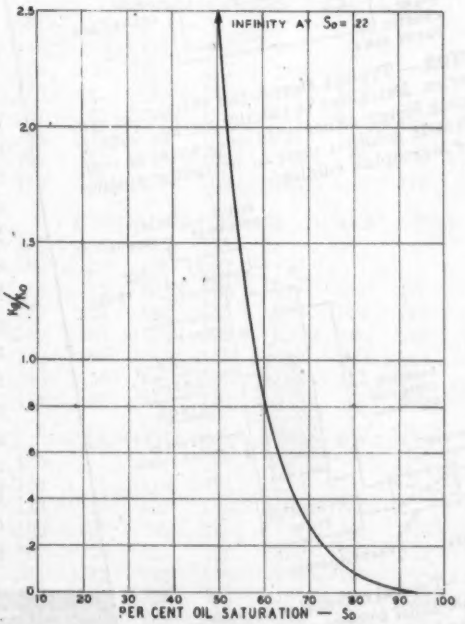


Fig. 1—Typical plot of k_g/k_o as a function of saturation

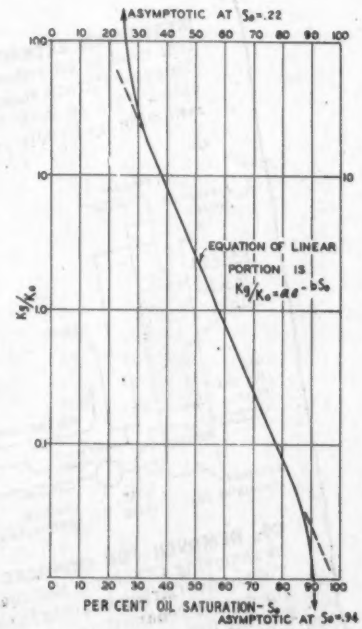


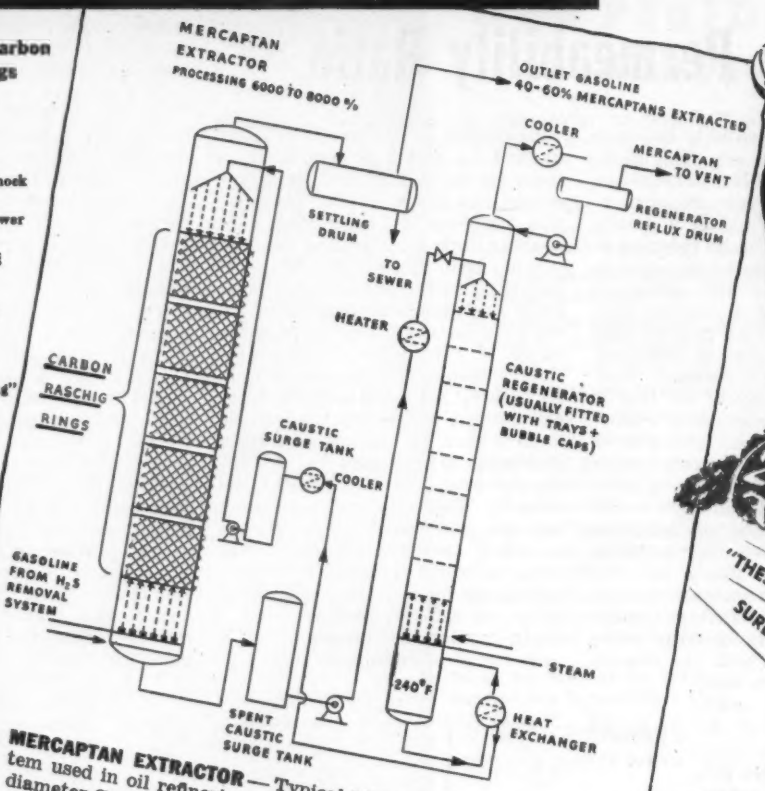
Fig. 2—Typical relationship between k_g/k_o and saturation

Series prepared by Dr. John C. Calhoun, Jr., Petroleum Engineering School, University of Oklahoma

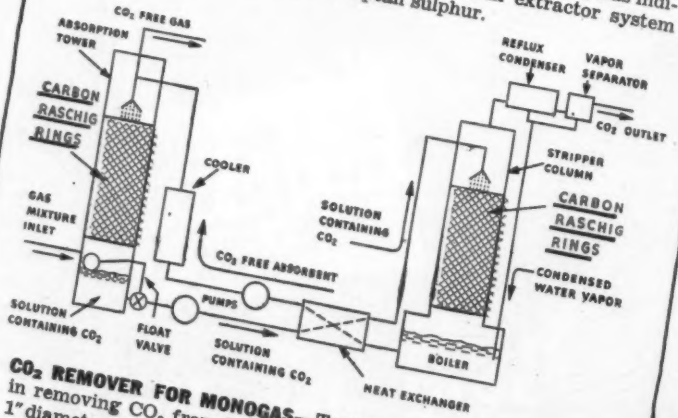
Pack your towers...with CARBON Raschig Rings!

Advantages of Carbon Raschig Rings

- Corrosion resistant
- Light in weight
- Immune to thermal shock
- Won't crush in the tower
- Minimum of chipping and spalling
- More contact surface
- Low back pressure
- Eliminate "channeling" of flow material



MERCAPTAN EXTRACTOR—Typical Mercaptan extraction system used in oil refineries. Extractor is usually packed with 1" diameter Carbon Raschig Rings, either solid or by trays as indicated. 10% to 20% NaOH solution used in extractor system removing up to 60% of Mercaptan sulphur.



CO_2 REMOVER FOR MONOGAS—Typical extraction system used in removing CO_2 from Monogas. Both towers are packed with 1" diameter Carbon Raschig Rings for maximum contact surface, absence of "channeling," and minimum back pressure. Carbon Raschig Rings are suitable to a wide range of tower-packing jobs.

●"National" "Kempruf" Carbon Raschig Rings provide the most economical and efficient tower-packing material for reaction and scrubbing towers handling corrosive agents, such as hydrofluoric acid, organic-hydrochloric mixtures, and hot aqueous alkalies. These rings are also excellent in extraction systems . . . towers in which sudden temperature changes result in severe thermal shocks . . . rectifying towers . . . and tower processes where thorough dispersion is essential to satisfactory operation.

For more information, write to:
NATIONAL CARBON COMPANY, INC., Dept. OG

The terms "National" and "Kempruf" are registered trade-marks of
NATIONAL CARBON COMPANY, INC.
Unit of Union Carbide and Carbon Corporation
UCC
30 East 42nd Street, New York 17, N. Y.
Division Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Viscosity of Vapors—
Gas Oil, Kerosine, and Naphtha

SIMILAR data on gasolines and gases will appear in The Refiner's Notebook No. 185 of February 26, 1948. The viscosities shown here were computed by the correlation of Uyehara and Watson (Nat. Pet. News, Tech. Sect., Oct. 4, 1944). Few direct experimental data are available on heavy hydrocarbons or mixtures of them.

Caution—(see Figs. 1 and 2) Interpolation of the tabular material is difficult because the lines cross each other. At extremely high pressures the vapors begin to partake of the viscosity properties of liquids.

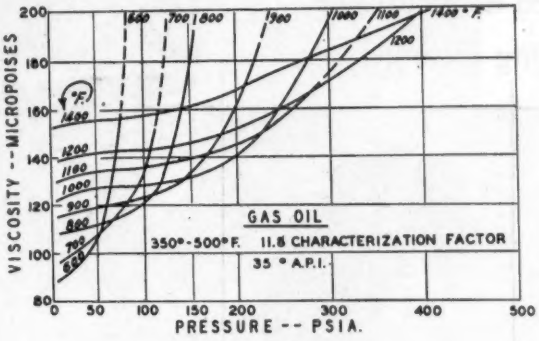


Fig. 1

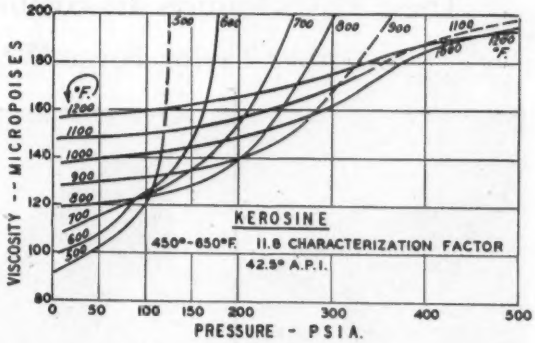


Fig. 2

APPROXIMATE VISCOSITY OF GAS OIL, KEROSINE, AND NAPHTHA VAPORS,* MICROPOISES†

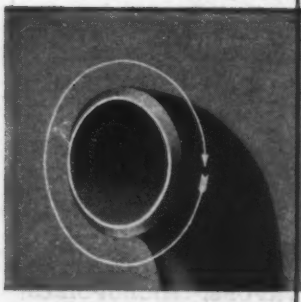
Temperature (°F.)	Pressure, psia. 14.7	50	75	100	125	150	200	250	300	350	400	450	500	700
GAS OIL (450°-650° F., 35° A.P.I.)														
600	90	107	157	...	...	...	...	...	...	...	...	...	...	...
700	97	108	118	134	180	...	...	...	...	...	...	...	...	...
*800	109	113	126	120	132	180	...	...	...	...	...	...	...	...
*900	116	119	121	124	127	132	161	...	...	...	...	...	...	...
*1,000	124	127	128	128	130	132	140	163	196	239	290	...	...	...
*1,100	133	134	135	136	137	139	145	156	174	198	227	260	...	...
*1,200	139	142	143	143	144	145	152	161	172	185	199	218	246	...
*1,400	154	155	156	157	159	161	168	176	184	190	199	208	220	...
KEROSINE (350°-500° F., 42.5° A.P.I.)														
500	95	103	110	121	184	...	...	...	...	...	...	...	...	...
600	101	108	117	124	133	147	...	...	...	...	...	...	...	...
700	110	116	120	124	129	137	154	190	...	...	...	...	...	...
*800	120	122	123	124	125	129	140	163	198	310	...	...	...	...
*900	129	130	131	132	133	137	140	149	167	192	224	...	...	...
*1,000	138	139	140	142	143	145	149	154	162	174	185	190	195	...
*1,100	148	149	150	151	152	153	156	161	169	179	188	194	198	...
*1,200	157	158	158	159	161	162	166	170	175	182	188	191	193	...
NAPHTHA (300°-450° F., 46° A.P.I.)														
400	90	100	...	...	...	...	...	...	...	...	...	...	...	...
500	99	104	109	119	140	210	...	...	...	...	...	...	...	...
600	109	113	117	122	128	135	161	...	...	...	...	...	...	...
700	118	120	122	125	128	131	146	169	201	244	...	...	...	...
*800	129	130	130	131	132	133	139	152	170	190	210	232	258	...
*900	140	141	142	143	144	145	147	150	155	162	172	182	194	257
*1,100	161	162	163	165	166	167	170	173	177	182	187	194	200	234
*1,300	180	181	181	182	183	184	186	188	190	194	197	201	206	228

*Note that cracking or decomposition will change the composition at temperatures past about 700° F. unless the time is very short. †One-thousandth of a poise or 1/10,000 of a centipoise.

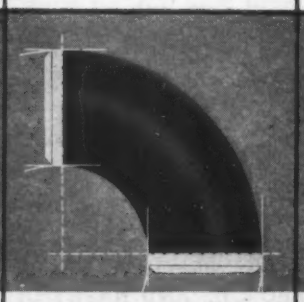
No. 183 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

What do YOU want in a welding fitting?

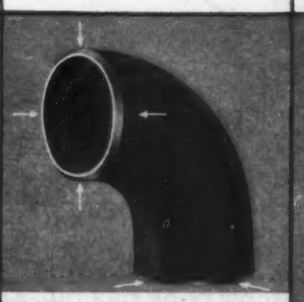
These *PLUS* features are combined in WeldELLS and other Taylor Forge Welding Fittings.



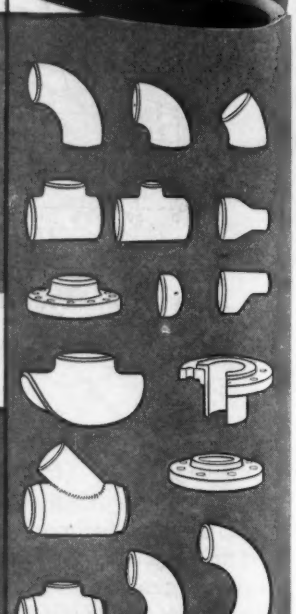
Seamless—No question about soundness in a fitting that is forged and formed seamless.



Tangents—Keep weld away from zone of greatest stress—simplify lining up.



Precision quarter-marked ends—Expedite layout; insure accuracy. A constructive refinement.



Full line—The most complete line of welding fittings and forged steel flanges in the world—greatest range of types, weights, sizes.

Complete identification—Permanent type; saves time; prevents errors.

Wall thickness never less than specification minimum—Assures full strength and long service life.

Machine tool beveled ends—Provides *the best* welding surface; accurate bevel and land.

...Yes **WeldELLS** *have everything*

TAYLOR FORGE & PIPE WORKS

General Offices & Works: Chicago 90, Ill. (P.O. Box 485)

EASTERN PLANT: CARNEGIE: PA.

DISTRICT OFFICES

New York: 50 Church Street — Philadelphia: Broad Street Station Bldg. — Chicago District Sales: 208 S. LaSalle Street

Houston: City National Bank Bldg. — Los Angeles: Subway Terminal Bldg.

OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

by John M. Spears

(1) NEW NAVION supplies rapid transportation for field-survey work, pipe-line patrol, transportation of personnel, shipment of critical machinery, and a wide variety of other uses. Plane has 150-m.p.h. cruising

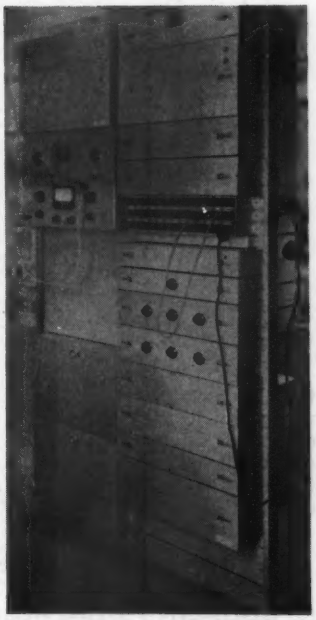
speed, while retaining excellent stall and landing characteristics, stability in rough air, roominess, ease of flying, and wide visibility. Improved draft-free ventilation and thorough sound insulation are features of new craft. Range with four passengers has been increased 50 per cent to a 750-mile maximum at normal cruising speed by the installation of a 20-gal. auxiliary tank. *Ryan Aeronautical Co.*

IT'S NEW CHECK IT

(2) CORO-GARD, anticorrosion protective coating, prevents corrosion of steel tanks in sour-crude fields for 2 years. It has a synthetic-resin base, a powdered mica-gray pigmentation, and a slovent consisting of methyl-isobutyl-ketone and butyl acetate, 1:1 by volume. Black variation is achieved by added 2 per cent carbon black. Solids content is approximately 26 per cent. Viscosity corresponds to thin syrup—3-5 at 80° F. on a 26 wire of MacMichael viscosimeter. Application is by conventional spray, brush or slosh, and involves no activators, heat cures, or primers. *Minnesota Mining & Manufacturing Co.*

IT'S NEW CHECK IT

(3) ELEVEN-CHANNEL RADIO CARRIER provides as many as 11 duplex voice channels on a two-way radio circuit. Equipment answers the need for radiotelephone link installations along pipe-line system and from one production or drilling camp to another. Carrier equipment is shown in the right-hand rack in illustration, while the rack to the left contains measuring and telegraph gear. On installation, carrier equipment is required only at terminals of the radio link, which consists of intermediate repeater stations involving radio-frequency relaying only. Carrier channels can, however, be terminated or connected to side circuits at any repeater point with appropriate equipment. One design feature permits a 15-kc. program channel with one to eight added channels. This provides order wire circuits; channels for facsimile; circuits for telegraph; or telemetering or remote control over studio-transmitter links. A complete line of f-m and a-m telegraph equipment; signaling apparatus for ringdown; and control and telemetering gear is available for use with this carrier equipment. Power-supply voltage and frequency requirements are matched to the particular installation. *Lenkurt Electric Co.*



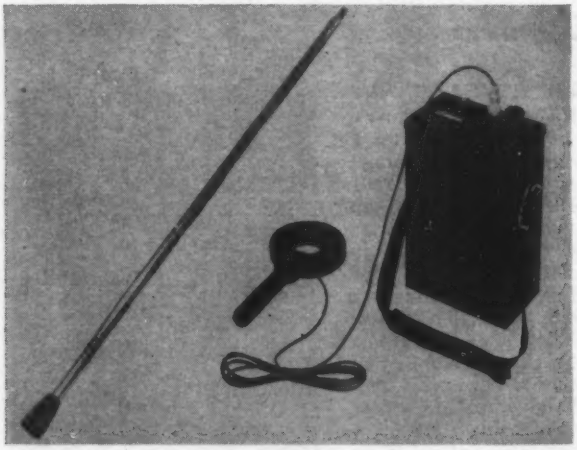
IT'S NEW CHECK IT

(4) CIRCUIT TRACER provides a simple means for tracing concealed wiring, locating buried pipes or cables, and locating short circuits or grounds in electrical wiring. Unit consists of a 9-lb. detector-amplifier with self-

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

Keep Informed. Save Time. Tear Out Card. Check It. Mail It.

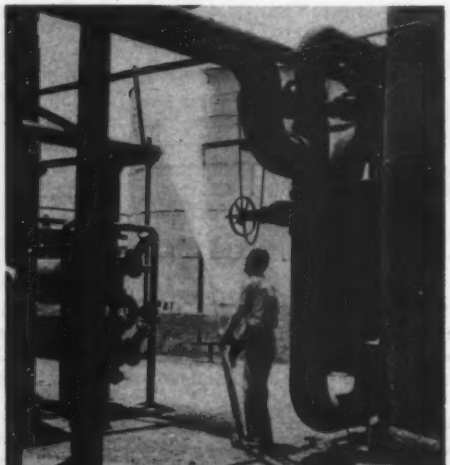
contained tubes and batteries, a light-weight pickup loop, and an extension pole. In operation a 60-cycle current from normal electric-power-service sources is impressed on the circuit to be traced through a capacitor. Circuit tracer and pickup loop are tuned to respond to



the 300-cycle signal developed by the capacitor and will permit tracing path of the desired circuit even with other nearby power circuits in normal operation. By this method electric currents can be set up which will indicate the exact path of concealed metal structures or the location of grounds or short circuits. *Eltron, Inc.*

IT'S NEW CHECK IT

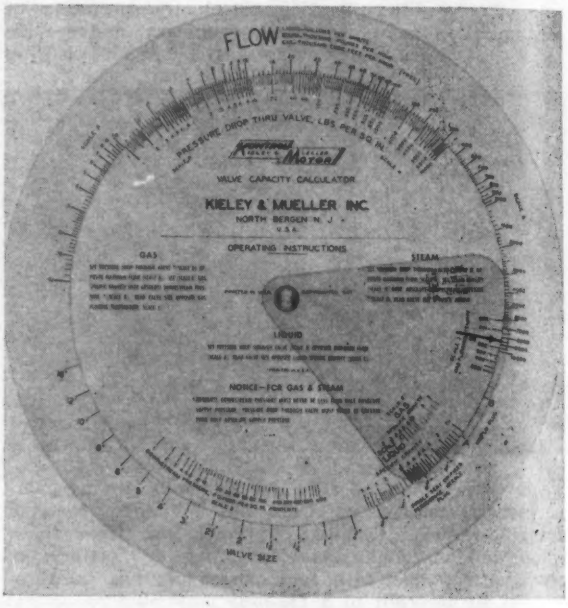
(5) GLASS-CORD STEAM HOSE is for heavy-duty cleaning and hydraulic service in oil refineries, natural-gasoline plants, chemical plants, etc., and for plant protec-



tion where steam is used for fire extinguishing. The fabric layer between outer and inner tube of rubber consists of a twisted yarn made of glass fibers and then coated with rubber. These cords are only 0.025 in. in diameter and result in a wall only 9/32 in. in thickness, a horizontal braider weaves 48 Fiberglas cords around rubber tube in making new hose. Hose will carry saturated steam at a temperature of 388° F. at a pressure of 200 psi. *Goodyear Tire & Rubber Co.*

IT'S NEW CHECK IT

(6) VALVE CAPACITY CALCULATOR has been designed from data obtained in an extensive series of tests under actual operating conditions. Several valves of each type were tested, all standard production units. Calculator operates from these factors: (a) rate of flow through



the valve, or capacity; (b) static pressure and pressure drop through valve, or resistance; (c) valve size. Correction scales for steam quality and liquid and gas specific gravity are included as well as a flowing temperature for gases. On back of calculator a table lists factors to be used in sizing various types of valves. Another table shows the relative capacity of the valve at any given opening. *Kieley & Mueller, Inc.*

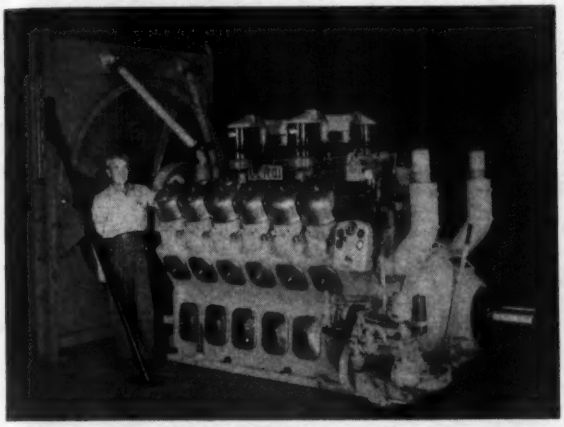
IT'S NEW CHECK IT

(7) SAMPLE BOX for crude-oil storage tanks mounts on a single flange on the side of the tank and through internal lines samples are taken from three separate levels. Internal piping and valves prevents freezing. Valves are push-button type. Sample box is equipped with a simple diaphragm pump for returning the sample to the tank after analysis. A few strokes of the pump handle complete-

ly evacuates a sample to the tank even when the storage tank is full of oil and under pressure. The cast aluminum box is equipped with a tight fitting gasket lid which has provisions for locking to prevent tampering. *Enardo Manufacturing Co.*

IT'S NEW CHECK IT

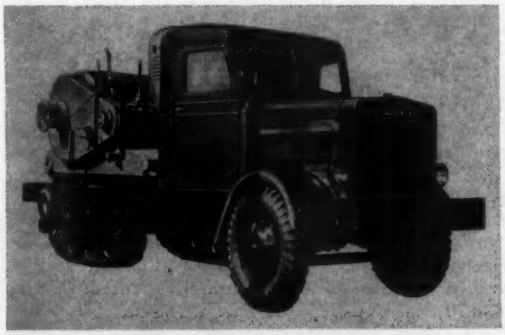
(8) NEW OIL-FIELD ENGINE has greater horsepower in a single portable unit. New V-12 engine has a maximum power range up to 600 hp. Applications include power for heavy rotary-drilling rigs, mud-pump drives,



pipe-line pumping, and generator service. Engine has a 7¼-in. bore and 7-in. stroke; displacement is 3467.7 cu. in. Weight as illustrated is 13,500 lb. The engine design includes overload valves, individual cylinder heads, removable cylinder sleeves, one-piece crankcase, hydraulic valve-operating mechanism, water-cooled manifolds, modern cam-ground pistons with full-floating pins and full-measure lubrication. Fuel system is adaptable to natural gas, liquid butane, and gasoline. *Le Roi Co.*

IT'S NEW CHECK IT

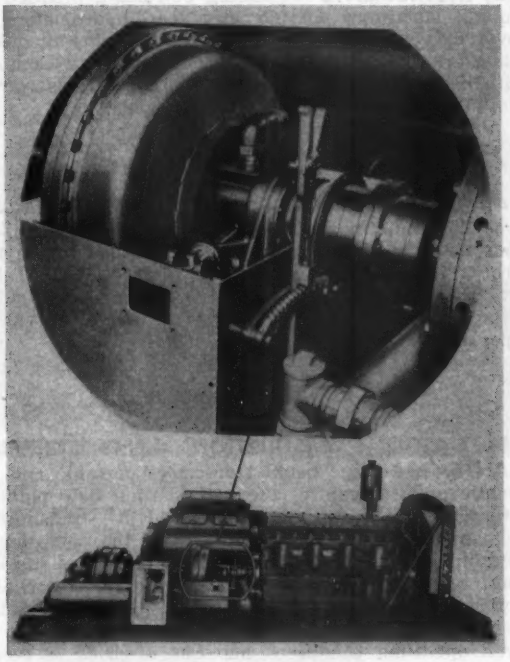
(9) HAFTRAK SERVICE RIG. New model Haftrak is specially designed for mounting service winches, assuring an all-weather, all-ground-condition transport to any



drilling or service location. This highly mobile unit will operate under conditions that bog down most general-haulage equipment. Off-highway unit is flexible, bites in to give maximum traction over sand, mud, ice, snow, or severe grades. Chassis is available with wheel bases from 140 to 330 in.—built to fit the requirements of the rig used. *Linn Manufacturing Corp.*

IT'S NEW CHECK IT

(10) FLUID-DRIVE DRILLING RIG. A builtin fluid drive distinguishes new "Ideal sectional drive groups" developed for Ideal Type 100 and Type 125 consolidated rigs. An important feature of this drive is a "sliding scoop," either hand controlled, as shown, or arranged for oper-



ation from the driller's position. Device speeds filling and emptying fluid from the new drives, thus enabling not only better control of power and speed, but utilization of the drive as a cutoff clutch and elimination of friction clutch. Units also eliminate alignment problems by assuring lifetime alignment. Sturdier frames and larger alloy shafts and roller bearing prevent damage in handling. The net length of the built-in drive in the 600-hp. size is 37 in. *National Supply Co.*

IT'S NEW CHECK IT

(11) PISTON RING EXPANDER easily and quickly installs and removes any size piston ring in diesel engines, gas engines, and compressors. Expander has three different jaw widths and handles rings from 7 to 24-in. diameter. Made of durable aluminum alloys. Expander's ratchet feature permits holding the ring in any expanded position desired. *Thilenius Equipment Co.*

IT'S NEW CHECK IT

TRADE LITERATURE

(12) UNDERGROUND PIPE WRAP. A 12-page brochure covers Vitron glass-fiber underground pipe wrap. Specification guide, coverage table, packaging data and field pictures show application of the glass fiber wrap for pipeline contractors and pipe-line department officials. *M. J. Crose Mfg. Co.*

IT'S NEW ✓ CHECK IT

(13) INSTRUMENTS for testing petroleum products including laboratory thermometers and hydrometers are covered in 40-page catalog. Material contains an official guide to principal tests of petroleum products. Complete with illustrations and tables—including various conversion tables. *C. J. Tagliabue Mfg. Co.*

IT'S NEW ✓ CHECK IT

(14) FLAT-LACED WIRE-ROPE SLING. New eight-page, two-color bulletin describes sling for oil-field applications made of six parts of wire rope laced together to form a flat, strong, and flexible lifting device. Tables list safe loads, dimensions and weights, and standard fittings. Illustrations show sling adaptable to various types of fittings. *A. Leschen & Son Rope Co.*

IT'S NEW ✓ CHECK IT

(15) GASOLINE ABSORPTION AND STRIPPING PLANTS. A 24-page booklet describes portable and automatic units to control the hydrocarbon dew point of natural gas within limits prescribed by transmission companies. There is an explanation of the operation of the plant, together with illustrations of typical installations, key equipment, and the flow cycle. A technical section reviews the design calculations, gives a summary of vapor and liquid compositions at various stages for given operating conditions and has a series of graphs on vaporation. *Blaw-Knox Construction Co.*

IT'S NEW ✓ CHECK IT

(16) DIAMOND CORING with Koebelite insert-type core bits is described in 13-page bulletin. Six glossy photographs of bits accompany material. Information includes advantages; reconditioning procedure; performance records; footage, speed, and cost figures; and economy characteristics. *Koebel Diamond Tool Co.*

IT'S NEW ✓ CHECK IT

(17) WATER COLUMNS AND GAGES. New 20-page, 2-color bulletin presents water columns and gages for refinery and plant operations. Cutaway drawings, and plant photographs accompany description. Dimensions and price tables included. *Yarnall-Waring Co.*

IT'S NEW ✓ CHECK IT

(18) SUBSURFACE CONTROLS AND SERVICES. A 32-page, 2-color, catalog contains nearly 50 illustrations and drawings, and complete operating details, data, and dimensions of all subsurface controls, equipment, and special services. Covered in the catalog are several new types of tools and equipment including surface safety valve, two-zone pumps, pressure-lock packers, completion tools, and snubbing and control equipment featuring new-type pressure-operated control heads. *Otis Pressure Control, Inc.*

IT'S NEW ✓ CHECK IT

(19) CHEMICAL-RESISTANT COATINGS. New descriptive bulletin on chemical-resistant coatings covers coatings for service under severe acid or alkali fumes, condensates, moisture vapors, alcohol fumes, greases, and oils. New coatings are fortified with rubber to resist chemical conditions which are the major cause of rust in many types of industrial plants. Listed on the bulletin's back page is a convenient nine-point check list that outlines directions for applications of the chemical resistant coatings on both rusted and clean metal. Illustrated. *Rust-Oleum Corp.*

IT'S NEW ✓ CHECK IT

(20) PRESSURE SNUBBERS. New two-color descriptive piece covers pressure snubbers which insure smooth, accurate, average readings on pressure gages. Cutaway illustration shows position and type of filter material. *Equipoise Controls, Inc.*

IT'S NEW ✓ CHECK IT

(21) TANKS. Two bulletins, one covering bolted and welded oil-field tanks and the other covering truck tanks, offer a pictorial description of a great variety of tanks. Field photographs, specifications, and list prices complete material. *Columbian Steel Tank Co.*

IT'S NEW ✓ CHECK IT

(22) VINYL-CLAD FINISH. New two-page descriptive material describes an advanced development in plastic protective coatings which act as a maintenance coating to prevent corrosion and other losses due to inadequate surface protection. Sample of plastic material is attached. *Plastic Lining Corp.*

IT'S NEW ✓ CHECK IT

(23) TUBE CLEANERS. New catalog contains 48 pages, printed in three colors, and is replete with excellent illustrations and conveniently arranged tables. It covers complete line of tube cleaners for use in refineries, power plants, and chemical process plants, etc. Virtually every type of cutter head is described in detail, as well as brushes and air, steam, and water-driven motors. Electrically driven tube-cleaning equipment and all accessories are also described and illustrated. *Thomas C. Wilson, Inc.*

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

Keep Informed. Save Time. Tear Out Card. Check It. Mail It.

R-S Improved Hand Centrifuge Machines--

Redesigned for increased durability and efficiency. Safety tube holders prevent tubes from bursting or injuring operator. Maximum speed 2500 r.p.m. Complies with A.S.T.M. D-96-35 and A.P.I. Code No. 25.

R. S. PLUMB BOB THERMOMETER

Serves Three Purposes . . .

1. To carry the Tape Down.
2. To Measure the Water in Bottom of Tank.
3. To Read Temperature of Oil.

Complete with Thermometer. Range 20° to 120° F.

COMPLETE LINE OF SCIENTIFIC LABORATORY EQUIPMENT

Write for Catalog No. 30-A

THE REFINERY SUPPLY CO.

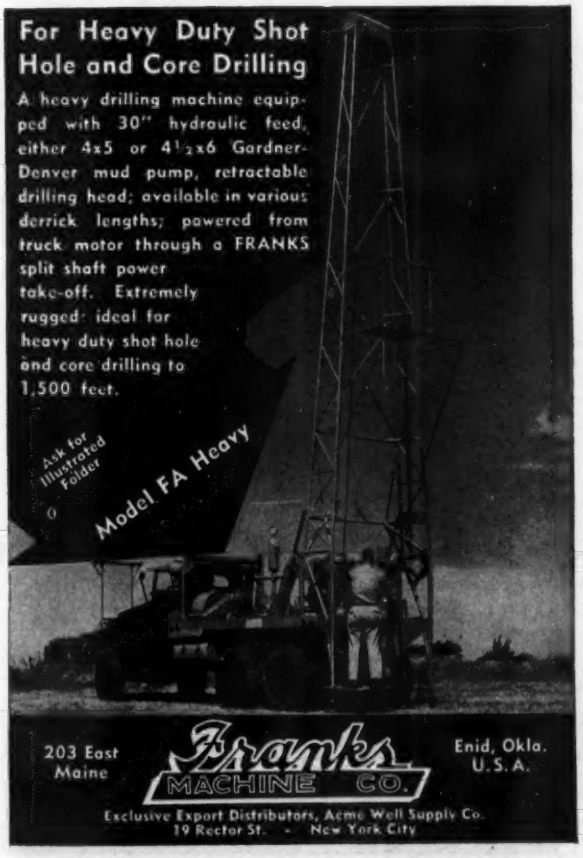
Main Office and Plant

621 E. 4th Street **TULSA 3, OKLAHOMA** Ph. 4-8144, L.D. 581

— Houston Office Temporarily Discontinued —

For Heavy Duty Shot Hole and Core Drilling

A heavy drilling machine equipped with 30" hydraulic feed, either 4x5 or 4½x6 Gardner-Denver mud pump, retractable drilling head; available in various derrick lengths; powered from truck motor through a FRANKS split shaft power take-off. Extremely rugged; ideal for heavy duty shot hole and core drilling to 1,500 feet.



203 East Maine

Franks MACHINE CO.

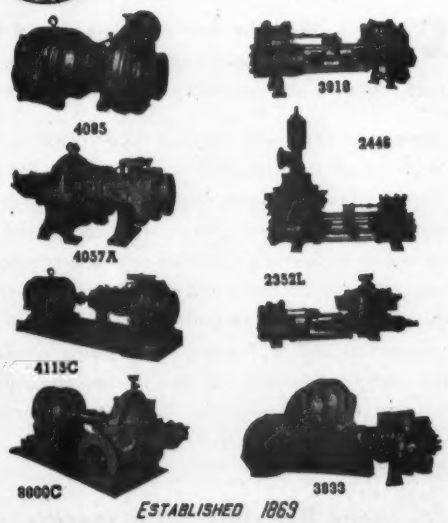
Enid, Okla. U.S.A.

Exclusive Export Distributors, Acme Well Supply Co. 19 Rector St. - New York City

PUMPS

CENTRIFUGAL
RECIPROCATING

BUILDERS OF OUTSTANDING PUMPS Since 1869



ESTABLISHED 1869

DEAN BROTHERS PUMPS INC.

INDIANAPOLIS IND.

323 W TENTH ST.

LEHMANN
is the Leader
IN LATHES FOR OIL FIELD WORK

32" Heavy Duty Lathe with 13" Hole in Spindle

Here's the Hollow Spindle
HYDRATROL

18"—20"—25"—32"—36" Swing, with Spindle Holes to 16⅛"

LEHMANN offers the most complete line of Large Hollow Spindle type lathes manufactured. Note that there's a size for every Oil Field requirement.

Important Features: Rugged taper attachment of large capacity, especially designed for Oil Field work . . . Timken bearing spindles . . . Hydraulic clutches for forward and reverse controlled from apron or headstock. Clutches are self-compensating, (No adjustment), and have full power capacity at all times . . . Hydraulic brake for close spindle position control . . . The large heavy duty lathes with the many refinements in design and construction, operate with the ease and simplicity of small machines . . . Also Standard Hydratrol Lathes, Sizes 16" to 36".

Send Us Prints, for a Specific, Time-and-Money-Saving Recommendation

LEHMANN *Machine Co.*
CHOUTEAU AT GRAND • ST. LOUIS 3, MO.

UNITED

Electric

Controls

Company

UNITED BLAST-PROOF CONTROLS PROTECT COSTLY EQUIPMENT

TYPE EJR CLOSE DIFFERENTIAL PRESSURE CONTROL

TYPE EJO THERMOSTAT

TYPE EGL PRESSURE SWITCH

All three of these electric controls are especially designed for use on processing equipment, storage tanks, diesel engines and similar industrial applications where dangerous fumes are prevalent. All have approved blast-proof housings, tapped for electrical connections, that may be mounted in any position on a flat surface. The EJO, a remote bulb type, ambient compensated thermostat with a calibrated external adjustment knob, is especially valuable for Pilot Duty temperature control of liquids or gases. The EJR and the EGL are close-differential pressure-vacuum switches for closely controlling air, gas or liquid pressures.

FOR COMPLETE DETAILS WRITE: Dept. O, 69-71 A STREET, BOSTON, MASS.

Standard & Special Thermostats & Pressure Switches

BETTER ALLOYS = Better Valve Checks

THE REASON FOR NO-CO-RO SUPREMACY

• For nearly half a century Norris Brothers, Inc., have specialized in the development of better steels as the *first* requirement of more efficient, longer-lasting valve checks. The resultant alloy—NO-CO-RO—is a truly remarkable metallurgical achievement. It resists the action of salt and acid. It will not pit, chip, or corrode—and it is available *only* in NO-CO-RO Balls and Seats and NO-CO-RO Drops and Seats.

Norris Brothers, INC.
ROBINSON · ILLINOIS

PIPE LINES

Medical Unit Added by Interstate, Carter

A NEW mobile medical examination unit, one of the most advanced of its type in the field of industrial medicine, was placed in operation this month by Interstate Oil Pipe Line Co. and Carter Oil Co., Inc.

The unit is designed to permit complete medical examinations to be given periodically to all employes of Interstate, Carter, and also to employes of the Ajax Pipe Line Corp., with which Interstate has a management contract.

In the past, it has often been necessary for company doctors to improvise medical examination facilities in the field.

Now, complete facilities for giving thorough physical examinations have been installed in a house trailer, including X-ray equipment, an electrocardiograph for early diagnosis of many types of heart trouble, a photographic dark room, ample laboratory facilities for the usual blood tests and urinalyses, an eye-testing apparatus and all of the usual supplies and minor equipment needed by the examining physician.

The unit is manned by a doctor and a laboratory technician. Motive power is furnished by a 1-ton truck, which also serves as personnel carrier and portable store house for medical supplies. The unit will be used only for examination and diagnostic work.

Offices Established for Michigan-Wisconsin Line

Ford, Bacon & Davis has established offices at 1330 Grand Ave., Kansas City, Mo., for handling construction operations for the 1,069-mile gas line being built from Texas to Michigan for Michigan Wisconsin Pipe Line Co.

Acting as agent for the Michigan Wisconsin company, Ford, Bacon & Davis will handle all affairs in connection with the building of the project. It is not expected that Michigan Wisconsin will have a staff for field operations until the line is put in operation.

V. H. Kyle, Jr., project manager, Ford, Bacon & Davis, supervises both the Michigan Wisconsin and the Austin Field Pipe Line Co. projects. W. B.

Above: Electrocardiograph examination being made of employe's heart in new Interstate-Carter examination unit. Table on which the subject is lying is part of the trailer's X-ray equipment. X-ray tube is in stand at upper left. Below: Exterior view of mobile medical unit. Truck and trailer together are 42 ft. long and weigh more than 6 tons

CRC

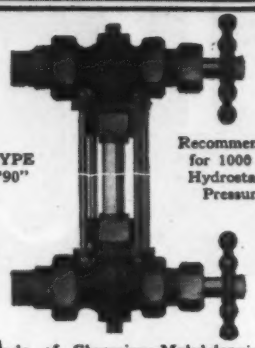
PIPE LINE CONSTRUCTION EQUIPMENT

CRUTCHER-ROLFS-CUMMINGS, INC.
Pipe Line Equipment and Materials
Houston - Tulsa

Years of experience and specialization, combined with a well integrated organization, result in more efficient pipe line construction.

CONSTRUCTION CO.
General Contractors
Oil • Gas • Gasoline • Water Pipelines
HOUSTON, TEXAS ATLANTA, GA.
L. H. Favrot — G. A. Peterkin — J. W. Sharman

PENBERTHY
DROP FORGED STEEL
LIQUID LEVEL GAGES



TYPE "90"

Recommended for 1000 lb Hydrostatic Pressure

Made of Chromium-Molybdenuin alloy temperature resisting steel, extra heavy throughout and stainless steel trimmed. Positive automatic shut-off; stainless steel balls shut off the flow of liquid if glass breaks. Regrinding removable seats, heavy duty stuffing boxes, union connections. Conform with A.P.I.—A.S.M.E. requirements.

This is one of the complete line of Penberthy gages that meet every liquid level gage requirement.

PENBERTHY INJECTOR CO.
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

"sabeco" bronze

"SABECO" Bronze is a mixture of copper, tin, and lead only. It's tough, but it contains no hard spots—will not score, seize, corrode, burn, or pound out, even if lubrication fails. That's why "SABECO" Bronze split washers are the best choice of the oil industry for taking up shaft end play in heavy duty machinery—that's also why it will pay you to keep "SABECO" Bronze bar stock on hand for producing your own lead screw nuts, bearings, and other parts. Write for complete particulars.

"SABECO"

SAGINAW BEARING CO.
635 S. WATER ST., SAGINAW, MICH. Cable "SABECO"

Poor, of Ford, Bacon & Davis, is chief engineer of the Michigan Wisconsin project. The present small personnel at the Kansas City office will soon be increased to approximately 100 employes including an accounting force, engineering department, and a land department, for the purchase of right-of-way.

Corporate offices of Michigan Wisconsin are located at 415 Clifford St., Detroit. The affairs of the company are managed by C. T. Dickeman, executive vice president, Michigan Theater Building, Detroit. The president, Frank Conrad, is located in the offices of American Light & Traction Co., Chicago, Ill.

J. R. Horrigan Construction Co., contractor of 225 miles of 24-in. at the western end of the project starting at Hitchtown, Tex., had laid 22 miles of pipe up to the end of last week. Work on compressor stations is not expected to start before midsummer.

Stanolind Lets Contract For Nelagony Loop

Stanolind Pipe Line Co. has awarded contract to Midwestern Constructors, Inc., for laying 12½ miles of 20-in. between Hominy station and Nelagoney Junction in Osage County, Oklahoma, according to an announcement by B. C. Clardy, president of Stanolind.

The new 20-in. loop will be on the main Stanolind system between Drumright and Chicago. Construction of the loop is to start February 15.

Midwestern Constructors, Inc., continues with the same ownership and organization. Officers of the company have held the following positions since the firm was started in 1938: F. E. Stanley, president and general manager; C. C. Bledsoe, secretary-treasurer; Clyde Wyant, vice president and general superintendent, compressor stations; B. L. Weller, assistant secretary; and Norman V. Jones, assistant treasurer.

Midwestern is engaged in installing nine additional compressor units for Texoma Natural Gas Co. at the Stinnett, Tex., No. 22 compressor station. This work, supervised for this contractor by John A. Bard, superintendent, will be completed in April 1948. Early this month this construction firm completed two pipe-line products terminal stations, one at Denver, Colo., and the other at Cheyenne, Wyo., for Wyco Pipe Line Co.

Western Prairie Plans Winnipeg Gas Line

Western Prairie Pipe Line Co. is applying to Canada's Parliament for an act to incorporate. Application for incorporation is being handled by so-

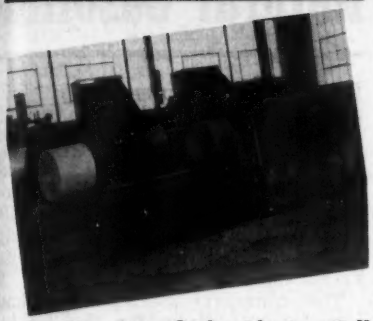
PIPELINES
•Finances
•Equipment
•Organization
TO BUILD

OIL PIPELINES GAS PIPELINES GASOLINE PIPELINES WATER PIPELINES

R. H. Fulton & COMPANY
CONTRACTORS
R.H. FULTON. OWNER

PHONE 5231 BOX 1542
LUBBOCK, TEXAS

IT PAYS TO CENTRALIZE THE JOB IN PIPE PROTECTION



How You Benefit by Placing Full Responsibility On Dependable
PIPE LINE SERVICE

In an operation as important as pipe protection, it is costly and troublesome to divide responsibility by ordering coatings from one source, wrappings from another and application from still a third.

To save you time, trouble, and money and insure satisfaction on every job, Pipe Line Service Corporation provides a complete service that takes all the headaches out of pipe protection. Our specialists take care of *all* the details, all the work. There is no division of responsibility, no chance of slip-ups.

It will pay you to depend on PLS complete service. It means only one order to write . . . one source of supply for your pipe protection requirements.

COMPLETE is the Word for Pipe Line Service

- Coating and Wrapping
  - —at the mill
  - —at yard or railhead
  - —over the ditch
- Pipe Cleaning Service
- Pipe Storage
- Pipe Delivery

PIPE LINE SERVICE CORPORATION

Pioneers in Steel Pipe Protection

General Offices and Plant • FRANKLIN PARK, ILL.
Plants at Glenwillard, Pa. • Longview, Texas
Corpus Christi, Texas • Harvey, Louisiana
Sparrows Point, Md.

licitors for Asler, Hammond & Nanton.

The object of Western Prairie is to build a natural gas pipe-line system from a point near Calgary, Alta., to Winnipeg, Man., which will serve cities and towns in southern Saskatchewan and Manitoba.

Cost of the pipe line has been estimated as $45,000,000. The new company proposes to acquire natural gas and provide for distribution in the localities where gas is to be sold.

Shell Oil Co., Inc., Is Purchaser at Benedum

Shell Oil Co., Inc., is the crude-oil purchaser in the new Benedum field, Upton County, Texas. Shell Pipeline Corp. is constructing the 8-in. line to connect the area. The latter, however, is not a crude-oil purchaser and is not buying the oil as stated in the Journal's article last week.

Commission to Determine Northwest Project Status

Prospects for the construction of Northwest Natural Gas Co.'s line from the Alberta fields of western Canada to Seattle, Wash., and other Pacific Coast cities will be determined by the decision of a joint Dominion government-Alberta government commission. Studies are being made of Alberta gas reserves for the purpose of considering whether the province would be justified in lifting the present export ban on gas. The joint commission, headed by Dr. George S. Hume, chief of the Dominion Geological Survey, will present its findings to the Alberta government, which is to establish the provincial policy.

The proposed $80,000,000 pipe-line project for exporting Alberta gas to the United States has been planned on the basis of a survey of Alberta gas reserves made by A. D. Brokaw, of Brokaw, Dixon & McKee.

The pipe line would follow an American route down the Columbia River and swing north into Canada.

Northwestern Expands Pipe-Line Facilities

Northwestern Utilities, Ltd., increased capacity of its trunk line to 80,000,000 cu. ft. daily from the Viking-Kinsella field to Edmonton, Alta., by the laying of a 19.4-mile, 16-in. loop recently completed. Previous peak capacity was 51,263,000 cu. ft. daily.

Total throughput of the Northwestern system for 1947 was estimated at the end of the year as approximately 10,000,000,000 cu. ft., representing an increase of 12 per cent over throughput in 1946.

"Everything for the Pipeliner"

PIPE COATING and WRAPPING MACHINES
Stationary and Line Traveling

PIPE CLEANING and PRIMING MACHINES
Stationary and Line Traveling

American Steel Works
HEATING KETTLES

PIPE LINE SUPPLIES AND EQUIPMENT

PERRAULT Brothers INC.
1130 NORTH BOSTON
TULSA 6, OKLAHOMA
Phone 5-1104

C. S. FOREMAN COMPANY
General Contractors
PIPE LINES
1221 Baltimore
Kansas City 6, Missouri

S. E. HUEY & CO.
ENGINEERS & SURVEYORS
OUACHITA BANK BLDG.
MONROE, LA.
SURVEYING & MAPPING
PIPE LINE SURVEYS

NATURAL GAS

T. G. T. Progressing With Large Looping Project

HOUSTON.—Though slowed somewhat by unfavorable weather, Tennessee Gas Transmission Co. is making steady progress on its current construction program which will step up capacity of the system to 600,000,000 cu. ft. of natural gas daily for 1948-49 winter demands.

About 340 miles of the total 1,050-mile looping program has now been completed, and the four spreads now working in the field will be increased to perhaps twice that number later with better weather conditions. Pipe is now being received in sufficient quantity.

The T.G.T. program consists of looping, largely with 26-in., its original 24-in. natural-gas line from South Texas to West Virginia, and various additions in compressor installations. Of the loops, 890 miles are 26-in., 78 miles, 24-in., and the remaining 82 miles, 20-in.

The work was approved by the Federal Power Commission in two different dockets. One authorization in July 1946 provided 410 miles of loops raising the system capacity from 264,000,000 to 381,000,000 cu. ft.; the second in August 1946 involved 460 miles of loop line and on completion capacity will be 600,000,000 cu. ft.

T.G.T. at present is delivering 345,000,000 cu. ft. daily. Capacity, which at the end of 1947 was 325,000,000 cu. ft., is being steadily expanded since the new loops are being tied together with the original line and placed in operation as each valve section is finished.

Completion of the entire program will give T.G.T. a continuously looped line from its compressor Station 5 at Natchitoches, La., east. This will be 26-in. loop except on the far east end where smaller diameters will be used. From Natchitoches west, the line will be augmented by partial loops.

Another T.G.T. project, a lateral 20-in. line extending 73 miles from Carthage, Tex., to Natchitoches, is due to be completed and in service this spring. This line was contracted by Latex Construction Co., Houston.

The company recently placed in operation compressor Station 2 near Victoria, Tex. Equipment includes three 1,600-hp. Cooper-Bessemer compressors to handle the 210,000,000 cu. ft. daily volume. E. L. Miller is station superintendent. More compressor capacity was made necessary by the completion last year of T.G.T.'s Valley line which extended the western terminus of the line to San Salvador field, Hidalgo County, with 99 miles of 16-in. Additons to existing compressor stations, consisting in some cases of a new station on the same location as an existing one, are being made along the line.

The four spreads now working on the loops are one company spread, one of Morrison Brothers, and two of Anderson Brothers. The company spread recently commenced a 36-mile section out of Monroe, La. Morrison is about half finished on 32 miles in northern Tennessee with operations directed out of Ashland City, Tenn. Anderson Brothers has completed 33 miles of a total of 84 miles in two spreads working out of Richmond, Ky.

Compressor Contract Let For Withers Gas Project

HOUSTON.—The Texas Co. has contracted for a new compressor plant in Withers oil field, Wharton County, Texas, as a part of a plan to utilize gas in the area.

Brown & Root, Inc., Houston, has received the contract to install and construct the plant which will include three compressors of 600 hp. each. Gas volume involved will be about 9,500,000 cu. ft. daily. The gas will be used for gas-lift and the excess disposed of to pipe line companies. A Texaco announcement said a definite program for the gas collection and distribution system in the field has not been outlined, due to the difficulties experienced in obtaining the necessary quantity of steel pipe.

Austin Line Proceeding Despite Michigan Weather

HOUSTON.—J. R. Horrigan Construction Co. reports that all operations are continuing in the construction of a 140-mile, 24-in. gas pipe line for Austin Field Pipe Line Co. from Austin field near Big Rapids, Mich., to near Detroit.

Construction work is proceeding under severe winter weather conditions. Four gangs are in the field with Ben Law, superintendent, in charge with headquarters at Owosso. Completion is scheduled for May. The line will be used to transmit stored gas to meet peak winter demand. One compressor station is under construction at the field end by Ford, Bacon & Davis.

The Horrigan company also had completed, as of last week, about 30 miles of a 225-mile section of the Michigan-Wisconsin Pipe Co. 24-in. line from Hugoton to Michigan. The section extends from Hansford, Tex., to near Hutchinson, Kans.; completion is planned for September. M. E Shiflett is Horrigan's superintendent with headquarters at Guymon, Okla.

Natural Gasoline

Lafitte Plant Expanding To Utilize Flared Gas

HOUSTON.—The Texas Co. is expanding its Lafitte (Louisiana) gasoline plant and constructing a 15-mile pipe line to utilize gas previously flared in Lake Salvador and Delta Farms fields.

The company announced it had awarded a contract for the 8⅝-in. pipe line to Associated Contractors & Engineers, Houston. The line will be located partly in Jefferson, St. Charles, and La Fourche parishes, Louisiana.

The company's announcement said the gas had previously been flared due to an absence of a market in the isolated fields. Hudson Engineering Corp., Houston, has the contract for expansion of the Lafitte plant where additional facilities will permit the processing of an additional 6,500,000 cu. ft. daily with the residue going to pipe-line sales.

Gasoline Plant Planned By Phillips in Texas

Phillips Petroleum Co. is planning construction of a gasoline plant in Hansford County, in the Texas Panhandle, that will have an initial production of 173,000,000 cu. ft. and an ultimate production of 343,000,000 cu. ft. daily.

The plant will produce 54,000 gal. of gasoline and 52,000 gal. of L.P.G. daily. Installations will include the gasoline extraction plant, storage facilities, gathering system and booster station.

Humble Starts Kilgore Plant Construction

Construction has begun on the $2,000,000 addition to Humble Oil & Refining Co.'s casinghead gas plant at Kilgore, Tex. Tanks and loading racks have been completed.

The additon will increase the plant's output of propane by more than 40 per cent. Present production is about 70,000 gal. of natural gasoline and propane-butane daily.

Fish Engineering Co. of Houston is handling the construction project.

Among the

Drilling Contractors

Charters Issued Two Oklahoma Drilling Firms

Two more drilling firms have been granted domestic charters by the Oklahoma secretary of state. **Altus Drilling Co.**, Oklahoma City, has been chartered with capital stock of $20,000 listed. Incorporators are F. C. Hall, L. C. Tharpe, and H. C. Holt, all of Oklahoma City.

Trigg Drilling Co., Inc., also of Oklahoma City, is listed with capital stock of $100,000 and the following incorporators: Dora Norton, Oklahoma City; Helen Green, Guthrie; Alma Rackley, Cheyenne; Alta Brown, Bethany; Hazel Frensley, Duncan; and Opal Gamble, Midwest City.

Arkansas Test for Quad

Quad Drilling Co. has contract for Houston Oil Co. 2 Gaughan, SW NW SE 34-13s-16w, Calhoun County, Arkansas. This well is an offset to Houston's 1 Gaughan which has recently been completed as Arkansas' first pool-opener for 1948. Discovery is located 3 miles west of Locust Bayou and is pumping 25 bbl. daily from Meakin sand at 1,990-2,003 ft.

Olson Brings in Deep One

Olson Drilling Co., Tulsa, was contractor on Shell Oil Co. 1 Walters, deep discovery well 4 miles south of Elk City, Beckham County, Oklahoma, which has been shut in after 60-day test period. Well has been shut down to await gas pipe-line connections, according to reports. During tests, well made 474 bbl. of 61-gravity oil daily, with 4-9 bbl. of salt water, through 12/16-in. tubing choke.

Fleet Drilling Co., San Antonio, will drill Carter Oil Co. 4 Mecklenberg, SW SE SE 6-3n-5w, Knox pool, Grady County, Oklahoma.

R. Hal Compton Drilling Co. et al have a prospective discovery well at their 1 Kirtley, wildcat in 19-L-28, McLean County, Kentucky, 3 miles west of Island. Test has hit saturated Benoist sand at 1,778-43 ft.

Frank Wood has contract for Bay Petroleum Co. and Anderson-Prichard Oil Co. 2 Watson Heirs, Block 84, J. H. Belcher subdivision, Montague County, North Texas. Test is northwest diagonal offset to operator's discovery well 7 miles south of Belcherville.

Harvey Drilling Co., Wichita Falls, has staked location for a 2,300-ft. test, its 1 Waide, J. N. Taylor Survey A-1275, 4½ miles northwest of Sanger, Denton County, North Texas.

B. G. Byars, Tyler, Tex., is drilling K. L. McKenry 1 Bolton, V. Mitchell Survey, 6 miles northeast of Lufkin, Angelina County, Texas.

Meredith, Clegg and Hunt, Houston, have completed as a producer 1 Sweet Lake Land & Oil Co.-Harrington Unit for the Sohio Petroleum Co. in Holmwood field of Calcasieu Parish, Louisiana, and are skidding over to drill same company's 1 Otto Harrington. Contract depth is 10,400 ft.

A. D. Britton Drilling Co., Olney, Tex., is starting a North Texas wildcat, the J. Frank Richardson 1 E. A. Stanley, J. A. Faucett Survey, 8 miles northeast of Gainesville, Cooke County. Contract is for 5,600 ft. or the Ellenburger.

Advance Drilling Co. will drill C. A. Lynch 1 Kelly-Wilson Community, 2,800-ft. test in NE NE SW 9-6s-13w, Posey County, Indiana.

Carl Brooks has contract for 2,500-ft. test in Sabine Parish, Louisiana. This wildcat is Petroleum South Corp. 1-A Bowman Hicks Lumber Co., 18-7-13w, between Blue Lake and Zwolle fields.

Arrow Drilling Co., Tulsa, and Sells Petroleum Co. are drilling a test in Harrison County, Texas, west of Longwood oil and gas production. Well is 1 Allen, Evans Survey.

H. E. R. Drilling Co., Oklahoma City, has started a 3,500-ft. test, its 1 Grissol, SE SE SW 1-9n-6e, Seminole County, Oklahoma.

Nowery Drilling Co., Shreveport, will cut hole for Phillips Petroleum Co. for a Harrison County, Texas, test west of Longwood oil and gas production. Well is 1 Rudd, on a 1,600-acre block 1,960 ft. north and 660 ft. west of southeast corner, McMillan Survey.

PENBERTHY

"REFLEX"

WATER GAGE SET

For oil field, locomotive type and marine boilers. Water shows black — steam shows white; the water level is unmistakable. U-Bolt construction is strongest and simplest to service. Glass replaced by simply removing nuts on face of gage . . . unnecessary to work between gage and boiler. Conforms with A.S.M.E., Federal and State requirements when used for pressures specified by their respective codes.

This is one of the complete line of Penberthy gages that meet every liquid level gage requirement.

PENBERTHY INJECTOR CO.

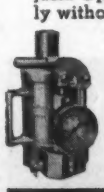
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

Simplex-Jenny

CENTER-HOLE HYDRAULIC PULLER

Makes Tough Pulling Jobs Easy

Does a wide variety of tough pulling, pushing and lifting jobs in minutes instead of hours. Center-hole construction makes the Simplex-Jenny its own back-up. Easily rigged up as a portable press or used as a conventional jack. Operates vertically or horizontally without side thrust or friction. Five models — 30 to 100 tons — all self-contained and light in weight for their capacity. Write for Bulletin 44J.



TEMPLETON, KENLY & CO.
1034 South Central Avenue
Chicago 44, Illinois

Simplex
LEVER · SCREW · HYDRAULIC
Jacks

USE 'BESTOLIFE IT'S BETTER

'BESTOLIFE—the Lead Seal Joint Compound used successfully in the Drilling and Refining Industries for years—is immediately available through more than 100 distributors in the U.S.A.

Your nearest supply house field store probably has 'BESTOLIFE in stock for immediate delivery. Use 'BESTOLIFE—it's BETTER!

EXPORT: THE NATIONAL SUPPLY CORP., 30 ROCKEFELLER PLAZA, NEW YORK

I. H. GRANCELL
1601 EAST NADEAU STREET
LOS ANGELES 1, CALIFORNIA

WEB WILSON
Rotary Tongs

"IT'S A WILSON"

Longer wear, less overhaul cost, means profit to you. Sizable savings made by specifying WEB WILSON.

See Composite Catalog Pages 3101 to 3120

WEB WILSON
Oil Tools
W. W. WILSON BUILDING
HUNTINGTON PARK, CALIF.

RUNNING High

Helmerich & Payne, Inc. Tulsa

GROWTH.—From the three cable-tool rigs W. H. Helmerich and William T. Payne owned in 1922 when

W. H. HELMERICH

W. BROADHURST

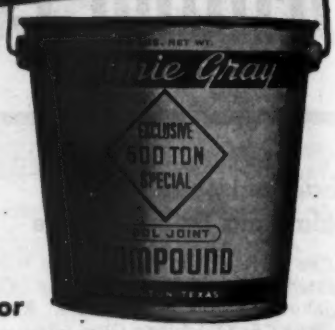
they started in South Bend and Breckenridge fields, in Texas, Helmerich & Payne, Inc., of Tulsa, has expanded to its present 19 rotary and 8 cable-tool rigs operating in Kansas, Oklahoma, Texas, New Mexico, Mississippi and Louisiana. The company was incorporated in 1926 with Helmerich as president and Payne as vice president. (Payne organized Big Chief Drilling Co., Oklahoma City, in 1936). Over the 25 years of its existence, H. & P. has built up a monthly production of its own in excess of 250,000 bbl. in addition to carrying on its contract drilling activities. It acquired Cardinal Oil Co. in 1946—a holding with some 300 wells in West Texas and still not fully developed. In 1944, White Eagle Oil Co. was organized.

RIGS.—Nineteen rotary power rigs ranging from shallow-depth mast rigs to the heaviest equipment.

PERSONNEL.—W. H. Helmerich, president; William Broadhurst, vice president; H. H. Griffin, vice president and secretary; Harry Saye, production superintendent; A. C. Duncan, assistant production superintendent; Herman Aweas, drilling superintendent; Erick Waering, chief geologist.

SIDELIGHTS.—H. & P. has several pool discoveries and extensions to its credit: Discovered South Braman field, Oklahoma, in 1925; Red Mesa field on Colorado-Utah line in 1926; Doyle pool in Oklahoma in 1937; and Hull-Silk pool in North Texas in 1938. Extended Blackwell pool, Oklahoma, to north in 1926; and Wasson pool, West Texas, to west in 1938. President Helmerich's chief claim to fame is his steak broiling, according to close friends. Vice President Broadhurst spends his spare time farming. Company owns a twin-engined Beechcraft-type AT11 and a Beechcraft Bonanza, one of which is specially fitted as a hospital plane.

LONGER LIFE



for

TOOL JOINT THREADS

Jimmy Gray's 500 Ton Tool Joint Compound* puts a protective film on the threads which prevents galling and washouts . . . makes breaking-out easier. It withstands highest pressures; is unaffected by heat and moisture . . . will not harden.

"You Can Always Break the Joint"

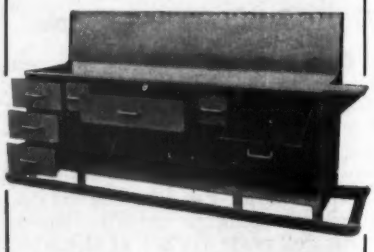
SOLD BY SUPPLY STORES EVERYWHERE

Distributed by

STANDARD OIL SALES CO.
Houston 1, Texas
P. O. Box 203 Charter 4-5848
*Trade mark Reg. U. S. Pat. Off.

OWEN

SAVE YOUR TOOLS — LOWER YOUR COSTS

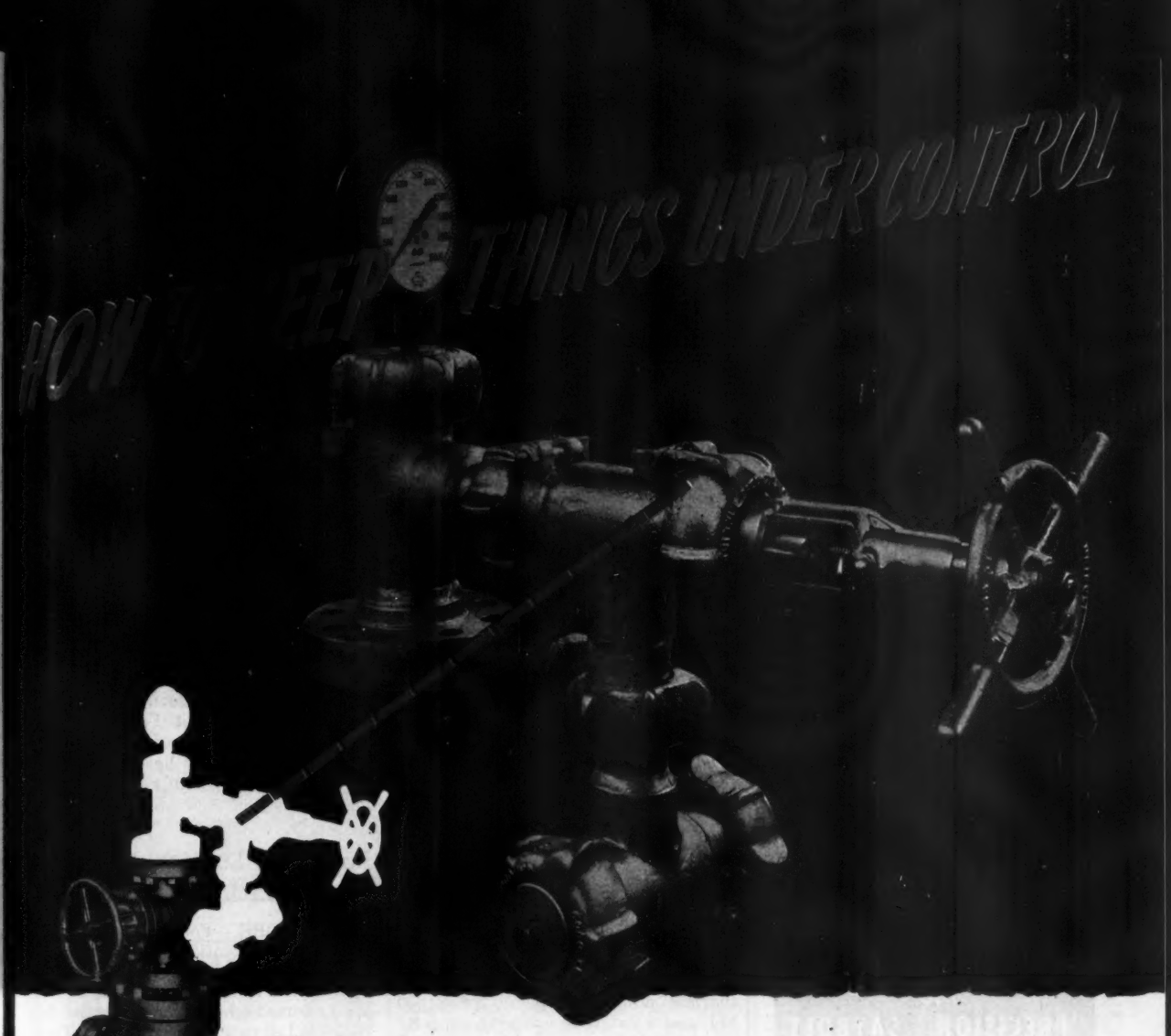


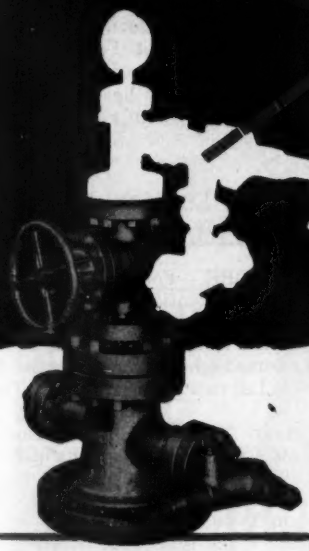
OWEN TYPE "A" WORK BENCHES protect tools and instruments against loss and damage and save valuable time by keeping the tools most often used within quick, easy reach when needed.

Equip your rigs with these all-steel, all-welded, weather-proof benches and watch your tool loss drop and your crew efficiency increase. Full particulars will be furnished upon request.

SOLD THROUGH ALL SUPPLY STORES

OWEN TOOL COMPANY
ROUTE 9 BOX 800-B V-2-4341
HOUSTON TEXAS





FEATURES:

The UNIBOLT Tee (Cross if double wing tree is desired) is a 3" size with 2½" flanged inlet and 2" side outlet. This unequal combination is particularly desirable in high pressure areas because its over-size bore permits the use of standard lubricators; however, it is available in any combination of sizes desired.

A UNIBOLT Adjustable Wing Valve takes the place of a gate or plug valve. Since high pressure wells are usually produced thru a small choke, resulting in low velocity flow thru the tree, the 1-inch opening in this valve is ample to assure unrestricted flow.

A UNIBOLT Choke Body, fitted with positive bean and blanking plug, provides a proven dependable, safe and convenient means for controlling the well flow. The blanking plug is removed by releasing a single bolt. The Choke Body is designed to receive either UNIBOLT "X" Type Beans (drilled in increments of 10% of well flow), or regular beans drilled in increments of 1/64".

Here's What Happens When You Fit UNIBOLT FLOW MANIFOLDS Into Your Christmas Tree Picture

In keeping with the trend toward light and simplified production control equipment, the UNIBOLT Flow Manifold was designed to eliminate much of the bulk and weight of conventional trees. Yet, because the patented UNIBOLT design places a greater area of metal in shear, this manifold actually provides a higher factor of safety than the heavier flanged manifolds.

The use of a UNIBOLT Adjustable Wing Valve instead of an ordinary gate or plug valve on the wing is an innovation that has met with the approval of numerous operators due to the fact that it not only costs substantially less but can also be completely overhauled without removal from the well.

Another important advantage of the UNIBOLT Flow Manifold is its complete interchangeability. All connections in the manifold are standard forged steel UNIBOLT Couplings, and any unit in the assembly, or part thereof, may be easily and quickly replaced in the field without removing the manifold from the well.

See Your Composite Catalog for complete details, or write direct for literature.

THORNHILL-CRAVER COMPANY

HOUSTON UNIBOLT THE ONE BOLT COUPLING TEXAS

UNIBOLT Flow Manifold

PENBERTHY
"TRANSPARENT"
DROP FORGED STEEL
LIQUID LEVEL GAGES

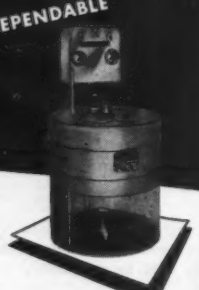
Used to observe color and density of liquids under high pressures and/or temperatures. Construction exceptionally sturdy. Made of alloy temperature resisting steel, and are highest quality throughout. Liquid chamber made from solid block of steel to assure perfect alignment and rigidity. Conform with A.P.I.—A.S.M.E. requirements.

The "Transparent" is one of the complete line of Penberthy gages that meet every liquid level gage requirement.

PENBERTHY INJECTOR CO.
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

The
"PRECISION" SAYBOLT
VISCOSIMETER

• IS MORE ACCURATE
• MORE DEPENDABLE



Polished Stainless Steel Exterior
Entirely self contained, built for continuous duty, the "Precision"-Saybolt Viscosimeter offers absolute dependability, and provides speed and accuracy in running Saybolt Tests.

Write for detailed literature No. 7-88-9R.

PURCHASE FROM YOUR LABORATORY SUPPLY DEALER

Precision Scientific Co.
3737 W. Cortland St., Chicago 47, ILL.

REFINING

First Gulf Projects to Be Finished in April

NEW construction under way at the Port Arthur, Tex., refinery of Gulf Oil Corp. is scheduled for completion during April, May, and June.

New units involved include three topping and vacuum units, each with a capacity of 22,000 bbl. daily, a catalytic desulfurization unit with a 17,000-bbl. capacity, and a naphtha polyform unit with a daily circulation of 32,000 bbl. The topping and vacuum units are being built by E. B. Badger & Co., and the other units by Lummus Co. The Port Arthur refinery at present has a crude capacity of 206,400 bbl. with a thermal cracking capacity of 68,000 bbl. and a catalytic cracking capacity of 30,000 bbl.

At its Philadelphia refinery, Gulf Oil has under construction a vacuum unit with a daily capacity of 12,000 bbl. and a naphtha polyform unit with a ciruculation of 16,000 bbl. Both are being built by Lummus Co. The Philadelphia refinery has a crude capacity of 74,700 bbl. daily, with a thermal cracking capacity of 23,000 bbl. and a catalytic cracking capacity of 18,000 bbl.

Gulf Refining Co. also has large expansion projects under way at its Toledo and Cleves (near Cincinnati) Ohio, refineries.

At Toledo, E. B. Badger & Co. is building a topping and vacuum unit with a capacity of 32,000 bbl. daily, scheduled for completion in October. M. W. Kellogg Co. is constructing a 15,500-bbl. fluid cracking unit and a 5,000-bbl. U.O.P. poly unit, both to be completed in May 1949. The Toledo refinery has a crude capacity of 23,000 bbl. daily and a thermal cracking capacity of 10,000 bbl. daily.

At Cleves, M. W. Kellogg Co. has under construction a 15,500-bbl. fluid unit and a 5,000-bbl. U.O.P. poly plant, both scheduled for completion in June 1949. This refinery has a crude capacity of 26,600 bbl. daily and a thermal cracking capacity of 14,000 bbl.

Phillips Awards Contract For Kansas City Project

C. F. Braun & Co., Alhambra, Calif., has been awarded a contract by Phillips Petroleum Co. for extensive construction work in the company's Kansas City, Kans., refinery.

The Phillips expansion program there includes installation of catalytic cracking and vacuum units and a catalytic polymerization unit.

At present the refinery has a rated crude capacity of 29,000 bbl. daily and a cracking capacity of 22,000 bbl.

Pana Refining Co. Is Sold to Cooperative

Pana Refining Co., Pana, Ill., has been purchased by Illinois Farm Supply Co., Chicago, affiliate of Illinois Agricultural Association, the Illinois organization of Farm Bureau, a cooperative.

The Pana refinery has a crude capacity of 4,000 bbl. daily and a cracking capacity of 1,750 bbl. daily.

Four New Lubricant Names Given A.P.I. Endorsement

NEW YORK.—Four new transmission and differential lubricant designations were announced here by the American Petroleum Institute, which are endorsed unanimously by the Institute's Lubrication Committee. They are:

Regular Type Gear Lubricant.—Suitable for automotive transmissions and in most spiral bevel and worm gear differentials.

Worm Type Gear Lubricant.—Suitable for truck-type gear worm gear rear axles under very severe conditions of service.

Mild Type E. P. Gear Lubricant.—Having load-carrying properties suitable for many automotive transmissions and spiral bevel differentials

COMPLETE
REFINERY ENGINEERING
SERVICE
★ ★ ★
PROCESSING
VESSEL DESIGN
PIPING
STRUCTURAL
DESIGN

S. W. LEWAREN & CO.
1572 N. HALSTED ST.
CHICAGO 22, ILL.

TRECo
REFINERY
CONSTRUCTION

Complete Petroleum Refining and Chemical Plant design and construction services. Our experience enables us to complete a project, well engineered and on schedule, at a minimum cost.

- CONSTRUCTION
- DESIGN
- OPERATING SURVEYS

THE REFINERY ENGINEERING COMPANY
Chicago, 600 Michigan Avenue
Tulsa, 24 N. Elwood

INDUSTRIAL
OIL AND GAS
BURNING
EQUIPMENT
AIROIL
NATIONAL
BURNER CO., INC.
1236 E. Sedgley Ave., Philadelphia 34, Pa.

"GUNITE" CONCRETE
(SINCE 1915)
LININGS FOR
BUBBLE TOWERS • SETTLERS • STILLS • SEPARATORS • TANKS • AND VESSELS OF ALL TYPES • ENCASING AND FIREPROOFING STRUCTURAL STEEL AND PIPE • LINING WATER RESERVOIRS, DITCHES, DRAINS AND CANALS • REPAIRING DISINTEGRATED CONCRETE AND OTHER MASONRY.
GUNITE CONCRETE & CONST. CO.
1301 Woodswether Rd., Kansas City 6, Mo.
District Branch Offices
R. N. Turner, Dist. Mgr., 228 No. La Salle St., Chicago 1, Ill. B. H. Mueller, Dist. Mgr., 6625 Delmar Blvd., University City (St. Louis), Mo. Philip D. Barnard, Dist. Mgr., 2036 Addison, Houston 5, Tex.
Branch Offices: Denver, Dallas, New Orleans

under severe speed and load conditions.

Multi-Purpose Type Gear Lubricant. — Having load-carrying properties suitable for hypoid gear and other types of differentials and transmissions.

Scientists Say Depth of Liquid Surface 1,000 Atoms

Scientists at the Stanford Research Institute, Stanford University, announced last week that they have determined that the depth of a liquid surface is about 1,000 atoms, or approximately a millionth of an inch.

The measurment indicates that molecular attraction takes place over a wider range than has even been proved before.

The discovery, the scientists said, may have practical applications in the fields of lubrication and oil exploration, where the reaction of liquid surfaces in contact with other materials is an important factor.

Practical applications in lubrication problems revolve around the fact that it is the liquid surface which is in direct contact with wearing surfaces, and the characteristics and performance of this liquid surface are important considerations.

This is particularly so, they pointed out, under the scientists' theory that the strength of strong materials influence, by molecular attraction, liquid surfaces which are in contact with them.

Such molecular influence, it was pointed out, may be the explanation of a puzzling phenomenon involving the flow of oil through a slender glass capillary or tube. When the tube is surrounded with water, the oil flows more slowly than when it is surrounded by air alone.

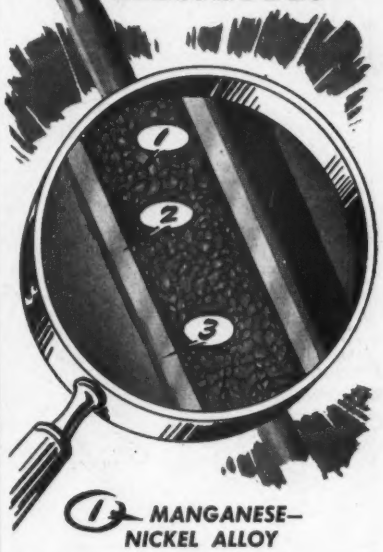
The behavior of liquid surfaces in the fine pores and crevices of rock formations may give a clue to oil engineers as to why it is difficult to get oil out of a well which is running dry, the scientists said.

Output of Lubricating Oils Shows Drop in December

Production of lubricating oils by 13 Midwestern refiners showed a decided drop in September, according to the Western Petroleum Refiners Association.

Bright stock output dropped from 9,467 bbl. daily in November to 8,848 bbl. in December; viscous neutral production dropped from 17,767 to 17,568 bbl.; paraffin oil output dropped from 3,957 to 3,500 bbl. daily, and the production of blended oils dropped from 18,961 to 18,490 bbl. daily. Production of steam refined stock showed a negligible increase, from 1,232 bbl. daily in November to 1,235 bbl. daily in December.

Better Weldability • High Build-Ups • Rapid Deposition Rate
Stoody
Manganese
ELECTRODES



1 MANGANESE–NICKEL ALLOY
2 MILD STEEL TUBE
3 SPECIAL COATING FOR SMOOTH, STABLE ARC

Stoody Manganese is a fabricated electrode having a mild steel tube filled with ferro-manganese and nickel particles. This special manufacturing process reduces electrode cost, provides better weldability and assures deposits having full Hadfield properties.

Besides lower cost you get these desirable features:

- Smooth Stable Arc
- Rapid Burn-Off Rate
- Low Penetration
- High Build-Up
- Low Spatter Loss
- Easy Slag Removal
- AC-DC Application

Stoody Manganese is available in ¼", 3/16" and 5/32" rod diameters; coated for AC-DC application, bare for DC only. Try 50 lbs. today! Sold by over 600 conveniently located Stoody distributors.

STOODY COMPANY
1138 W. SLAUSON AVE., WHITTIER, CALIF.
STOODY HARD-FACING ALLOYS
Retard Wear Save Repair

NORRIS *Quality* FITTINGS

NORRISIZED SWAGED NIPPLES

Forged from seamless steel tubing to rigid API specifications.

NORRISIZED BULL PLUGS

Triple-thick nose for strength where strength is needed.

NORRIS QUALITY PRODUCTS

FORGED STEEL WELDING REDUCERS

Forged from finest quality, full weight seamless steel pipe.

SILVER ANNIVERSARY 1923 IPE 1948

FORGED STEEL WELDING CAPS

Like all Norris products, made to highest standard of quality.

FOR COMPLETE SPECIFICATIONS WRITE FOR BULLETIN NO. 31-A

W.C. NORRIS, MANUFACTURER, INC.

TULSA, OKLAHOMA

BRANCHES:
HOUSTON, KILGORE, ODESSA, TEXAS; SALEM, ILLINOIS

EXPORT:
30 ROCKEFELLER PLAZA, NEW YORK CITY

Since QUALITY NORRIS PRODUCTS 1882

WEST COAST DISTRIBUTORS:
REPUBLIC SUPPLY COMPANY OF CALIFORNIA,
Los Angeles

Exploration and Drilling

Straws in the Exploration Wind

THIS is a report on what seem to be important trends in thinking among exploration men. First, for whatever significance it may have, the vast majority of them do not seem to share the popular pessimism about their ability to find plenty of new oil in the United States. Right or wrong, they seem to feel it is merely a matter of time; time in which to perfect some of the new ideas about exploration tools and ideas on which they are working; time in which to get the wells drilled they want to drill.

Here are some of the things they regard as significant. Instrumentation work on new tools, or improvements on old tools, for all practical purposes came to a dead stop for 5 years on account of the war. Just about 2 years have elapsed since work was started again as manpower was released from war service. The first results are beginning to show up, and rumors of more on the way are strong.

The possibilities are regarded as so favorable in some places, that a recent challenge to the geophysicists to segregate the functions of tool making and tool using is developing some followers. Without necessarily agreeing with the challenge, others point out that it is significant of trends in the field that anyone should dream of instrument development as a completely separate function from its use.

The combination and coordination of new tools and old methods, and their application to areas in which they have not been hitherto used is regarded by some as another trend. To give an idea of what new possibilities this may open, one exploration man called attention to papers delivered on exploration at the Penn State Secondary Recovery Conference last fall. In the birthplace of the oil industry, the Appalachian area, the exploration men are working on the problem of coordinating data from the airborne magnetometer, aerial photography, and new research ideas in sedimentology, and checking these against the old surface and subsurface facts available.

Others point out that an old familiar fact sometimes tends to be overlooked. They say that every wildcat drilled does add something to the field of knowledge in exploration. Therefore the fact that for the past few years the number of wildcats drilled has been increasing steadily and reaching undreamed of numbers, by sheer weight will prove important.

A check of facts reported in The Oil and Gas Journal since the end of the war indicates there is some merit to all these opinions. A very brief survey indicates that since December 1945, 13 references have been made to important trends along the lines pointed out by the various observers.

More than one exploration man takes the attitude that their problem is exactly the same as that of the steel industry, automotive industry, electric power industry, or locomotive and freight car builders. They need mainly a little more time to catch up with the postwar demand. Time and steel they insist are the only real problems.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

MICHIGAN.—Officials of the Pure Oil and Ohio Oil companies said drilling would continue on their 1 Rinehart, deepest test in the state, which is nearing 10,900 ft. Few encouraging shows have been encountered in the well to date.

NORTH LOUISIANA.—Hunt Oil Co. 1 Louisiana Delta, southern Catahoula Parish Wilcox discovery, opens the Cross Bayou field.

MID-CONTINENT.—Two good oil wells, Blair 2 Murphy, 26-23n-1w, and Continental Oil 2 Schemmer, 34-23n-1w, may link the South Ceres and Southeast Ceres pools in Noble County, Oklahoma. In Kansas, Stanolind Oil & Gas 1 Wheatley, Seward County discovery, continues testing the Upper Mississippian. In Illinois, Gulf Refining Co. 1 Parks, Rural Hill outpost, Hamilton County, produced 244 bbl. per day in testing the O'Hara.

CANADA.—Extensive expansion of the Leduc area is indicated by correlations between the field and Imperial-Woodbend 1, 3½ miles to the north, which has been completed for more than 2,200 bbl. daily.

SOUTH LOUISIANA.—The Texas Co. 4 State-Barataria, Lease 346, in the Queen Bess Island area of Jefferson Parish, is nearing the 15,000-ft. level after logging hole to 14,694 ft. The company's other deep venture, 6 State-Atchafalaya Bay, Lease 340, Belle Isle field area of St. Mary Parish, proved disappointing after drilling to total depth of 15,549 ft. where log was run; operators are now cutting and pulling 8⅝-in. protection which was cemented in the hole to 10,844 ft.

ROCKY MOUNTAIN.—Ames Management's second North Ant Hills venture flowed oil on test, and has caused renewed interest in the area. Husky's Madison test at Pitchfork, Park County, Wyoming, has found oil for a new pay zone in the field.

WEST TEXAS.—Pure Oil and Humble Oil & Refining 3-E-A Cowden rated Dollar Hide field's highest potential by flowing 450 bbl. per hour from the Silurian. Chancellor, Slick Oil et al 1 Davis, northern Pecos County deep wildcat, sprays distillate from the Ellenburger. According to latest reports, The Texas Co. 1-U State, south of Barnhart in Crockett County, was making a small amount of oil from the Ellenburger.

KANSAS

Seward County Discovery Still Testing

STANOLIND OIL & GAS CO. is still testing the upper section of Mississippi at 1 Wheatley, C NE SW 23-33s-31w, in Seward County. Plugs between perforated zones from 5,700 ft. to 5,921 ft. have been drilled and tests are being made from all perforations. The best showing reported to date was at 5,810-40 ft.

The Cities Service Oil Co. 1 M. Hall, SE SE SE 11-12s-17w, Ellis County, flowed 216 bbl. of oil and 3 bbl. of water in 15 hours through perforations at 3,656-90 ft. from the Arbuckle. The lime zone will be treated with acid. As a result of the new discovery, Cities Service has staked two new locations; SW SW SW 12-12s-17w and SE SE NE 11-12s-17w.

The Helmerich & Payne 1 Adams "A," SW SW NE 24-34s-30w, Meade County, in a test made from 5,810-5,902 ft. recovered 125 ft. of gas-cut mud in 55 minutes. A show of oil was also reported. This wildcat is 2½ miles north of the East Adams Ranch gas pool in the southwest part of the county.

In Rooks County the Delta Production Co. and Crow Drilling Co. 1 Gager, SW SW SE 28-8s-16w, extended the Laton pool ½ mile west at the north end of the pool. The well has been assigned a rating of 100 bbl. per day from the Lansing lime, through perforations at 3,144-52 ft. The Lansing was topped at 3,097 ft. and well was drilled to 3,385 ft.

For the week, 43 completions and 73 locations were recorded. Barton County led with 8 completions and 7 locations, followed by Butler with 3 completions and 10 locations, and Rice with 4 completions and 6 locations.

KANSAS SUCCESSFUL WILDCATS

Russell County: Stearns & C. G. Kissinger 1 Billings "C," NE NE NE 27-13s-15w, pumped 39 bbl. of 32°-gravity oil per day from Arbuckle at 3,320-31 ft.; anhydrite 948 ft., Lansing 3,067 ft., TD 3,331 ft.

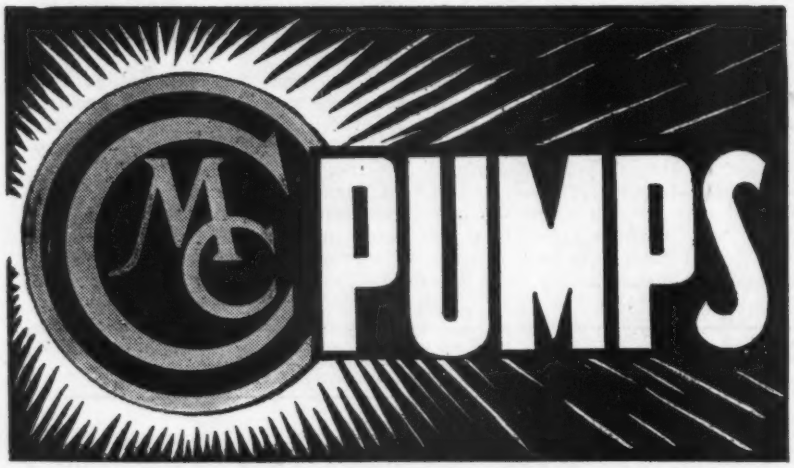
KANSAS WILDCAT FAILURES

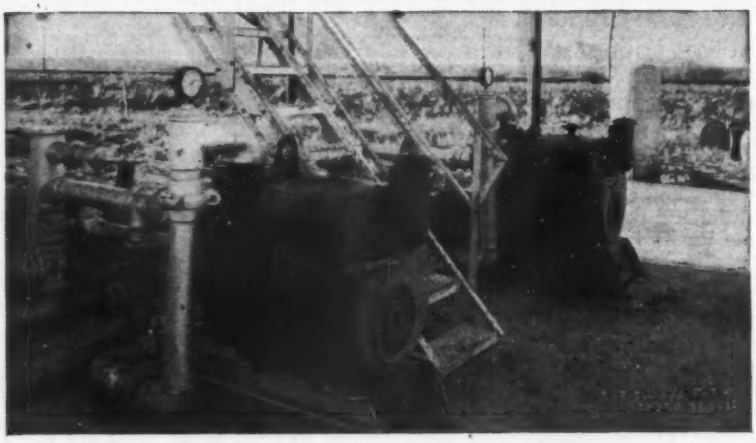
Barton County: M. A. Isern 1 Karst, SE SE SE 10-16s-14w, dry, TD 3,416 ft., Lansing 3,170 ft., Arbuckle 3,372 ft., show of oil 3,378-81 ft.

Butler County: Rex & Morris & Ed Adair 1 Edminston, NE NW NW 5-26s-4e, dry, TD 2,710 ft., Lansing 1,800 ft., Kansas City 2,090 ft., conglomerate 2,480 ft., Mississippian 2,540 ft., Viola 2,705 ft.

Sedgwick County: E. H. Adair & Aladdin Petroleum 1 Clark, NW NW SE 10-27s-1w, dry, TD 3,682 ft., Kansas City 2,652 ft., Basal Kansas City 2,843 ft., Mississippi 3,202 ft., Kinderhook 3,485 ft., Simpson dolomite 3,565 ft., Simpson shale 3,574 ft., Simpson sand 3,592 ft., Arbuckle 3,658 ft.

Woodson County: Patridge 1 Fegan, C S/2 SE SE 3-26s-14e, dry, TD 1,518 ft., Mississippi lime 1,506 ft.





UTILITY DUAL PRIME Model 420 4" Pump—20 H. P.

These two Model 420 Pumps loading Lub-Oil down in Texas is typical of the many services rendered by CMC Pumps for the oil industry. Ask our engineers to help you with your specific pumping problem.

CONSTRUCTION MACHINERY COMPANIES

Specializing in High Pressure Centrifugals, Dual Prime Centrifugals and Diaphragm Pumps for the oil fields.

Waterloo, Iowa
1903 Blodgett St., Houston, Texas

EASTERN TEXAS

Blackfoot Outpost Has Gas Show

DALLAS.—The Texas Co. 1 Barnard, Rinehart Survey, 1 mile north-northeast outpost test at the new Blackfoot field of Anderson County, recovered 2 stands of gas-cut mud from the Pettit limestone between 9,034-48 ft. Reports of oil with the gas were not confirmed at this report. Bottom-hole flowing pressure was 1,400 psi., increasing to 3,900 psi. when shut in. Texas' 1 R. F. Broadway, in the Welsch Survey, and south offset to the discovery, but showing for a producer in the Rodessa, retreated perforations at 8,972-92 ft. at 2,100 psi. The well was last reported flowing at intervals on various size chokes, making from 5 to 8 bbl. of oil, gas and wash water.

In San Augustine County, D. H. Byrd et al 1 T. W. Blount, Edmond Quirk Survey, had total depth at 9,017 ft. in lime and shale. The well kicked off and flowed acid water, mud with a slight show of green oil, for 7½ hours, then died, following treatment of perforations between 7,821-8,006 ft. in the James limestone. It was shut in to build up pressure, and started flowing again when opened. Surface pressure was said to be around 150 psi. on ½-in. choke. It was changed to 3/16-in. for cleaning when the flow died. Operators resumed swabbing, recovering acid water, wash water and a slight amount of oil. It was swabbed dry and shut in.

Drilling reports on exploratory tests indicated little change. A number of operations had work under way after a delay due to weather. In Bowie County, W. M. Coats 1 S. H. Hall was nearing 8,000 ft. in shale. Shell Oil Co., Inc., 1 Gerald Smith, west of Bloomburg in Cass County, was below 10,150 ft. in shale and sand. R. W. Fair 1 C. S. Ousley, Cherokee County, was drilling below 4,750 ft. In Freestone County, Humble Oil & Refining Co. 1 R. P. McWatters was drilling below 10,557 ft. in shale with streaks of sand. Delta Drilling Co. 1 Lindsay Gauntt, 1½ miles north of Athens, Henderson County, had work under way after a few days off due to weather, and was last reported below 7,328 ft. Shell's 1 F. E. Lumpkin, Kaufman County, was drilling at 10,172 ft. in sand, shale and anhydrite.

EAST TEXAS WILDCAT FAILURES (DISTRICTS 5 AND 6)

Kaufman County: Dail Goodson 1 F. S. Oldt, King & Nelson Sur., 3 mi. W

THOMPSON-HAYWARD FORMALDEHYDE *Reduces* CORROSION

- Save on Pulling Costs
- Save on New Steel
- Save on Shutdown Time
- Low Cost
- Dependable
- Field Tested

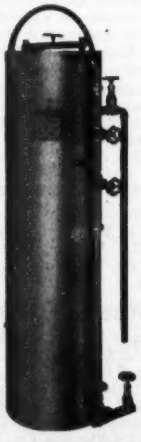
Protect expensive and hard-to-get steel parts from hydrogen sulphide corrosion and corrosive mine and well waters, with Thompson-Hayward Formaldehyde.

Warehouse Stocks Available For Prompt Shipment

THOMPSON-HAYWARD CHEMICAL CO.

DALLAS · HOUSTON · DENVER
WICHITA · TULSA · SAN ANTONIO
NEW ORLEANS

AVOID LOSS OF ENGINE EFFICIENCY AND COSTLY RIG SHUT-DOWNS *with a* MURKIN WATER SOFTENER



A few hours of down-time on a drilling rig would more than pay for a Murkin water softener. Eliminates scale, slime and corrosion to engine radiators. For any purpose where abundant free flowing soft water is needed.

ECONOMICAL TO USE
EASY TO OPERATE

Anyone can operate a Murkin. New funnel type head makes recharging quick and easy. Exclusive new clamp type cap. Portable. HUNDREDS IN USE. Names of users on request. See your local supply dealer or—

MURRAY TOOL & SUPPLY CO.
General Office:—1703 S. E. 29th Street
Oklahoma City, Oklahoma
Elmore City · Pawhuska · Tulsa

Magic pulse!

Line error is completely eliminated in AMERICAN Mercury Actuated Dial Thermometers with the new *magic pulse* self-compensating capillary tubing which automatically corrects for ambient temperatures along the line.

The comprehensive AMERICAN line of Vapor, Gas and Mercury actuated Dial Thermometers—each built for a specific purpose—has represented the ultimate in accuracy and durability for nearly a century. The *magic pulse* self-compensating tubing now permits a wider application of the advantages inherent in mercury actuation. A Manning, Maxwell & Moore field engineer is available in your locality to demonstrate this new feature and help you select the correct instrument for your particular service.

American Glass, Dial and Recording Thermometers are sold by leading distributors everywhere. Write to them or to us for information.

MAXWELL MANNING & MOORE INC. M&M TRADE MARK

AMERICAN
Industrial Instruments
A Product of
MANNING, MAXWELL & MOORE, INC.
BRIDGEPORT 2, CONNECTICUT

Makers of 'American' Industrial Instruments, Hancock Valves, Ashcroft Gauges, Consolidated Safety and Relief Valves.

PENBERTHY
"ALL IRON"
LIQUID LEVEL GAGES

Body made from a special high strength alloy iron, shanks alloy steel and trim stainless steel. Extra heavy construction throughout, automatic and positive shut-off if glass breaks, heavy duty stuffing boxes. Conform with A.P.I.—A.S.M.E. requirements.

The "All Iron" is one of the complete line of Penberthy gages that meet every liquid level gage requirement.

PENBERTHY INJECTOR CO.
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

GERONIMO

FOR THE SAFETY OF YOUR MEN

DERRICK ESCAPE MECHANICISM

NET WEIGHT 15 LBS.

GLIDE TO SAFETY ON GERONIMO (Patent Applied For)

GERONIMO will stand hardest wear and give unfailing protection to refinery and derrick men whose lives are endangered by fire, escaping gases or other hazards.

EASILY ATTACHED OR REMOVED
EXTRA STURDY CONSTRUCTION
QUICKLY STRADDLED
POSITIVE, INSTANT BRAKE
BRONZE "No-Spark" SURFACES
RECOMMENDED FOR ½" WIRE LINE

• Write for Illustrated Folder •

SOLD THROUGH YOUR SUPPLY STORE
— MANUFACTURED BY —
CHARLIE'S MACHINE WORKS
PERRY, OKLAHOMA

Scurry, dry, TD 3,313 ft., Austin 1,055-1,571 ft., Woodbine 1,983 ft., Coleman limestone 2,533 ft., Paluxy 3,245 ft., by samples, elev. 403 ft.

J. C. Moore 1 F. S. Greer, Wesley Boles Sur., 2 mi. SW Scurry, dry, TD 2,070 ft., pipe stuck, will skid rig and drill new hole.

OKLAHOMA

Two Good Wells in Ceres Area, Noble County

THE completion of two new oil wells in the Ceres section of Noble County has led to much speculation that the pools may eventually be linked. The B. B. Blair 2 Murphy, SW SE NE 26-23n-1w, of Ceres Southeast flowed 160 bbl. of oil in 5 hours through 1-in. choke. Casing was set at the top of the Bartlesville, 4,385 ft., and the total depth was 4,420 ft. The well is a diagonal offset to the 1 Murphy which had a flow of 413 bbl. per day through 1-in. choke. The Continental Oil Co. 2 Schemmer, NE SW SE 34-23n-1w. Ceres South flowed 412 bbl. in 4 hours through 1-in. choke. Bartlesville was topped at 4,476 ft. and the total depth was 4,529 ft. T. T. Easton & Co. announced another wildcat location in Noble County near the Ceres area, the 1 Kuballa, SE SE SE 3-23n-1w. Operator will seek pay in the Mississippi lime.

The Wilcox Oil Co. 2 Woodward, NE NW NE 13-12n-9e, Okfuskee County, opened another Wilcox sand pool. The pay zone was from 3,907 to 3,915 ft. with total depth 3,918 ft. The well swabbed a little over 4 bbl. per hour. The 1 Woodward was also a producer, but from a shallower formation.

The Stanolind Oil & Gas 1 Young, NW SE SE 25-13n-3w, Oklahoma County, flowed 214 bbl. per day from the Bois d'Arc. The well, an offset to the discovery, was drilled to 6,371 ft. with casing set at 6,314 ft.

Another Oklahoma County well, the Double-R Drilling Co. et al 1 Rogers, SW SW NE 18-14n-1e, shows as a good prospect. On 1-hour test at 4,335-50 ft., a little free oil and 50 ft. of gas-cut mud were recovered. The well is located in the extreme northeast portion of the county and east of the Coon Creek-Arcadia field.

OKLAHOMA SUCCESSFUL WILDCATS

Oklahoma County: Skelly 1 Adam, C SW NW 29-13n-2w, flowed 40 bbl. of oil per day from sand at 6,161-76 ft., TD 6,235 ft.

Pottawatomie County: Phillips 1 Rutherford, NW NE SE 2-10n-4e, pumped 40 bbl. of oil per day from Earlboro at 3,995-4,022 ft., TD 4,036 ft.

OKLAHOMA WILDCAT FAILURES

Cotton County: Blair 1 Manning, SE SW SE 17-1s-9w, dry, TD 2,508 ft., lime 2,430-52 ft.

Norman Drilling Co. 1 Hunt, NW NW NW 15-2s-10w, dry, TD 2,321 ft., sand 2,240-72 ft.

Garfield County: Tharpe 1 Miller, NW NW SW 22-21n-4w, dry, TD 4,760 ft.

Garvin County: Zephyr 1 Strehlow, SW SW SW 20-4n-2e, dry, TD 4,176 ft., Basal Pennsylvanian-Viola 3,612 ft., Bromide lime 3,770 ft., Bromide sand 3,912-63 ft., shale 4,064-4,172 ft., dolomite 4,172-76 ft.

Grant County: Falcon 1 Gullinger, SW NE NE 29-29n-3w, TD 4,980 ft., Layton 3,595 ft., Oswego 3,970 ft., Mississippi lime 4,505 ft., Woodford 4,840 ft., Viola 4,920 ft., no Wilcox, second Wilcox 4,928 ft.

Hughes County: Sunray 1 Sehorn, NW NW NW 12-7n-9e, dry, TD 2,840 ft., Senora lime 1,032 ft., Senora sand 1,056 ft., Earlsboro 1,768 ft., Bartlesville 2,208 ft., brown lime 2,530 ft., Booch 2,674 ft.

McClain County: Ledford 1 Bagwell, SW SW NE 36-6n-3e, dry, TD 3,425 ft., Hogshooter 2,584 ft., Wanette 3,350 ft.

Marshall County: Allied 1 School Land, SW SW NE 1-5s-4e, dry, TD 4,408 ft., sandy dolomite 4,255 ft., sand 4,390 ft. with stain of oil.

Noble County: Derby 1 Huffington, SW NW SW 1-21n-2w, dry, TD 5,545 ft.

Pottawatomie County: Porter Oil & Gas Co. 1 Martin, NW SE SW 28-10n-5e, dry, TD 4,813 ft., Woodford 4,475 ft., Sylvan 4,580 ft., Viola 4,700 ft., Deese 4,740 ft., dolomite 4,754 ft., Wilcox 4,793 ft.

Seminole County: Anderson 1 Factor, SW NW SW 17-7n-7e, dry, TD 4,421 ft.

Manahan 1 Rose, SW SE SW 29-9n-7e, dry, TD 3,495 ft., Senora 2,700 ft., Earlsboro 2,960 ft., Inola 3,095 ft., Bartlesville 3,105 ft., Booch 3,374 ft., Gilcrease 3,423 ft., Cromwell 3,452 ft.

MICHIGAN

State's Deepest Test Reported Nearing Granite

SAGINAW.—With only geological data as return for a year of effort, Michigan's deepest search for oil is nearing its end as drilling approaches granite, according to reports. The hole this week was approaching 10,900 ft. far exceeding the 10,147 ft. record of before the war. This deepest test is the Pure Oil Co.-Ohio Oil Co. 1 Rinehart in Mills Township, Ogemaw County, 5 miles southeast of West Branch. Officials said drilling would continue indefinitely. Already more than $900,000 has been spent on the well. Only infrequent small shows of oil and gas were noted as the hole deepened, unlike the previous deepest well, the Gulf 1 Bateson in Bay County, which was plugged back after going below 10,000 ft. and for a time was operated as a gas well before being abandoned several years ago.

Michigan field operations in the past week resulted in 13 completions for 5 oil producers and 8 dry holes. One of the producers was a 7-bbl. wildcat in Bushnell Township, Montcalm County, completed by J. E. Hood and producing after acidizing from Traverse limestone at 2,636 ft. Six of the 8 dry holes were wildcats. Of the 768 bbl. potential daily from the producers, 640 bbl. is from another Kimball Lake field producer in Newaygo County. The small producers were completed in Arbela of Tuscola County, Kawkawlin of Bay and Bloomer of Montcalm.

Of the 12 new locations, 6 are scheduled by Ervin Major and Fred Riddell in the Arbela field of Tuscola County; 2 others are in Newaygo, and 1 each in Clare, Bay, Arenac and Kalkaska.

MICHIGAN SUCCESSFUL WILDCAT

Montcalm County, Bushnell Township: J. E. Hood 1 Hopkins, SW NW NW 36-9n-6w, pumping 7 bbl., acidized, from Traverse limestone, TD 2,670 ft., plugged back to 2,636 ft.

MICHIGAN WILDCAT FAILURES

Allegan County, Clyde Township: Ohio Oil Co. 1 Cosgrove, NE NE NW 29-2n-15w, dry in Traverse limestone, TD 1,246 ft.

Lee Township: Norman L. Stevens 1 Hambley, NE NE SW 31-1n-15w, dry in Traverse limestone, TD 1,225 ft.

Manlius Township: Ohio Oil Co. 1 Smith & Sons, Inc., SE SE SW 33-3n-15w, dry in Traverse limestone, TD 1,362 ft.

Monterey Township: Ford Henry 1 Furjanick, SW NE SW 3-3n-13w, dry in Traverse limestone, TD 1,660 ft.

Overisel Township: Fisher-McCall Oil & Gas, Inc., 1 Hommeke, NW SW SW 10-4n-14w, dry in Traverse limestone, TD 1,519 ft.

Bay County, Pinconning Township: Ward Oil Co. 1 Johnson, SW NE SW 36-17n-4e, dry in Dundee, TD 3,050 ft.

N. CENTRAL TEXAS

Wise County Offset Has Shows of Oil

WICHITA FALLS.—Early this week Cities Service Oil Co. 1 Flowers, Thompson Survey, west offset to the company's conglomerate discovery in northwest Wise County, had shows of oil and porosity. It topped the Caddo limestone at 5,085 ft., said to be about flat with the discovery, then cored from 5,090-5,140 ft. Recovery was 47 ft., the top 3 ft. being shale, and the balance limestone having scattered shows and porosity. Operators cored on to 5,161 ft., but lost the core, and were reaming for a drill-stem test.

In Throckmorton County, Cities Service 1 Schlittler, Block 1648, TE&L Survey, recovered 5 ft. of mud having an odor of oil, on a drill-stem test of the Caddo at 3,840-68 ft. Operators were drilling below 3,898 ft. Location of the test is south of the Donnell field, which produces from both the Caddo and the Mississippi limes.

In Montague County, L. W. Barrett 1 McCall, prospective conglomerate discovery in the J. G. Cox Survey, 1¾ miles southeast of Mallard, topped conglomerate at 6,400 ft. A drill-stem test between 6,400-26 ft., open 1 hour, showed gas at the surface in 8 minutes, and recovered 1,080 ft. of free oil, plus 180 ft. of oil-cut mud and 15 ft. of water. Whether or not it was formation water was not immediately known. Bottom-hole pressure was 2,450 psi. at the end of the test. Operators then drilled ahead.

Sinclair-Prairie Oil Co. and Continental Oil Co. 1-A Minor, 2 miles northwest of Montague, topped Barnett shale at 6,408 ft. It was drilled to 6,430 ft., not yet in the Mississippi, and stopped to run casing to bottom.

In Jones County, Geochemical Surveys, Inc., 1 J. R. Simpson et al, 10 miles northeast of Abilene, Section 18, Block 16, T&P Survey, was attracting interest as a possible multiple-pay discovery. Operators set casing to top of the Frazier pay, of the Hope section, at 2,770 ft. The well was said to have headed oil at 15-minute intervals during attempts to kill it for deepening, and is thought to be coming from a 9-ft. section. Observers pointed out that while nearest production is in the Akard field, 1½ miles to the west, nearest production from the Frazier is the Wimberly-Reddin area 4 miles southwest. It was said that other areas with pay in the Frazier zone have produced from one or more pays.

New locations in West Central Texas totaled 20 for the week, including 1 wildcat each in Brown, Fisher, Jones and Shackelford counties. In new work, Shackelford led with 5 new starts; Brown 4, Jones and Stephens each 3, Fisher and Taylor each 2, and Throckmorton 1. Completions, 14 oil and 11 dry, included 1 discovery in Comanche County, and 2 wildcat failures. Oil well completions, by counties, were: Brown 1, Eastland 1, Haskell 3, Jones 3, Shackelford 3, Stephens 1, and Throckmorton 1.

In North Central Texas 39 new locations included 8 wildcats. By counties, the wildcats were: Archer 2, Wichita 2, and 1 each for Clay, Cooke, Jack and Young. Development locations were: Archer 5, Clay 3, Cooke 2, Jack 3, Montague 8, Wichita 5, and Young 5. Thirty-four completed wells, 21 oil, 1 gas and 12 dry, included 1 discovery in Montague County and 4 dry wildcats. Development oil completions were: Archer 2, Clay 4, Cooke 1, Montague 1, Wichita 5, and Young 7 oil and 1 gas.

NORTH CENTRAL TEXAS SUCCESSFUL WILDCAT (DISTRICT 9)

Montague County: Continental Oil Co. 1 C. P. Miller, Sec. 21, Limestone County School Land Sur., A-421, top Caddo 6,053 ft., Bend conglomerate pay 6,196-6,212 ft., TD 6,344 ft., PB 6,275 ft., flowed 83 bbl. oil first 3 hours, 171 bbl. oil 6 hours, ½-in. choke, potential 684 bbl. a day, 43° gravity, tubing pressure 250 psi., GOR 949 cu. ft.

NORTH CENTRAL TEXAS WILDCAT FAILURES (DISTRICT 9)

Archer County: W. G. Gouchie 1 H. Osterman, Lot 24, Blk. 4, Clark & Plumb Subd., 2½ mi. W Windthorst, dry, TD 1,151 ft. in hard sand, Gunsight lime 1,092 ft.

E. R. Perkins 1 R. Campbell Estate, Sec. 1,812, TE&L Sur., 5 mi. NE Olney, dry, TD 1,160 ft. in shale.

Cooke County: Chapman & McFarlin 1 Whaley, Blk. 2, W. C. Winters Sur., 3½ mi. W Muenster, dry, TD 3,628 ft. in conglomerate, no tops reported.

Wichita County: Ted A. Norwood et al 1 Myers, Sec. 830, TE&L Sur., 3 mi. NW Clara, dry, TD 2,000 ft., broken limestone with oil odor 1,855-65 ft.

The Texas Co. 1 A. Holtzen, F. Huseman Sur., 6 mi. NW Burkburnett, dry, TD 2,535 ft., no shows.

WEST CENTRAL TEXAS SUCCESSFUL WILDCAT (DISTRICT 7-B)

Comanche County: T. A. Kirk et al 1 S. D. Mears, Wm. DeMoss Sur., 2 mi. E. Gorman, flowed 308 bbl. 40°-gravity oil a day, ¼-in. choke, Marble Falls 2,790-2,811 ft., TD, casing pressure 650 psi., tubing pressure 400 psi., GOR 750 cu. ft.

WEST CENTRAL TEXAS WILDCAT FAILURES (DISTRICT 7-B)

Hood County: Signal Oil & Gas Co. et al 1 Dennis Jones, Harrison Quinn Sur., 2 mi. NE Lipan, dry, TD 5,278 ft., Ellenburger 5,156 ft., water 5,272 ft., elev. 927 ft.

Jones County: West Central Drilling Co. 1 C. N. Humphrey, Sec. 2, Blk. 4, H&TC Sur., 3 mi. SE Stamford, dry, TD 5,324 ft., Palo Pinto 3,470 ft., Caddo 4,926 ft.,

Install Them and Forget Them!
AMERICAN
RADIAL
Roller Bearings
AMERICAN RADIAL ROLLER BEARINGS are engineered to exacting standards that result in better performance and minimum maintenance.
Furnished in 5 styles, 6 S.A.E. series and 85 sizes. Special designs also available. Write.
AMERICAN
ROLLER BEARINGS
HEAVY DUTY
AMERICAN
ROLLER BEARING CO.
420 Melwood Street
Pittsburgh, Pa.
Pacific Coast Office:
Los Angeles, Calif.

WECO
Thread Compounds

WECO makes the finest thread compound available for every type connection in the oil fields. WECO Thread Compounds are free of acid qualities and other corrosive agents. All WECO Thread Compounds are non-hardening. No WECO Thread Compound requires a thinner. Nothing protects threads like dependable WECO Compounds.

Sold Through Leading Supply Stores

WELL EQUIPMENT MFG. CORP.
Subsidiary of Chiksan Company
Houston 1, Texas
Export Representation:
CHIKSAN EXPORT COMPANY
New York 7 Brea, Calif. Houston 1

WECO
Manufacturers and Distributors of Oilfield, Refining, Marine and Industrial Equipment

Mississippi 5,195 ft., Ellenburger 5,113 ft., elev. 1,563 ft.

Throckmorton County: S. D. Johnson 1 E. A. Posern, Sec. 682, TE&L Sur., 2½ mi. SE Woodson, dry, TD 4,042 ft., Caddo 3,815 ft.

LA.-ARK.

New Wilcox Pool for Catahoula Parish

SHREVEPORT.—Hunt Oil Co. 1 Louisiana Delta, 6-4n-5e, discovery of the Cross Bayou field in southern Catahoula Parish, is erecting tanks for production tests, after flowing an estimated 250 bbl. of 40°-gravity oil in 24 hours through 15/64-in. choke from the Wilcox sand. Flowing tubing pressure was 1,000 psi., and gas-oil ratio was estimated at 3,000 cu. ft. The wildcat had been drilled to 10,442 ft. in the lower Cretaceous before plugging back to 5,670 ft. The producing zone, around 5,500 ft., was tested on the basis of side-wall cores made while drilling. At 5,500-23 ft. these cores indicated sand with gas odor, and cores between 5,580-98 ft. recovered sand with good oil odor. Top of the Wilcox was approximately 3,950 ft., on an elevation of 58 ft. Nearest Wilcox production is at Larto Lake, 6 miles to the northeast, where production was found (1941) at 5,110 ft.

C. H. Murphy et al 1 George Pipes, gas-distillate discovery 2 miles northeast of Bear Creek field, Bienville Parish, was taking gage. Its estimated rate of flow last week was around 100,000,000 cu. ft. of gas a day, plus 4 to 8 bbl. of distillate per 1,000,000 cu. ft. of gas.

In Claiborne Parish, Carter Oil Co. 1 Gandy, 28-19n-7w, had total depth at 11,002 ft. in the Cotton Valley and was awaiting sufficient pipe to set casing on bottom. Electric log indicated gas below 10,300 ft., and the possibility of several sands below that depth. Bottom-hole tests will be made when enough casing is secured.

Another Claiborne deep test is Union Producing Co. 1 Addie Durrett, 31-20n-5w, which was fishing stuck drill pipe around 4,000 ft. Total depth is 11,123 ft.

In DeSoto Parish, The Texas Co. 1 F. J. Rambin, 23-11n-11w, on the south flank of the Bull Bayou field, was drilling below 4,000 ft. A drill-stem test at 2,813-25 ft., open 30 minutes, produced a slight blow and recovered 330 ft. of mud and water; 240 ft. of salt water, and 90 ft. of mud with a trace of oil and gas. Bottom-hole flowing pressure was 1,250 psi.

W. O. Woodward et al 1 Edenborn estate, 14-8n-4w, Grant Parish, was drilling below 7,873 ft., with no tops reported. H. L. Hunt 2 Louisiana Delta, 1-4n-4e, LaSalle Parish, was drilling at 5,480 ft. Carter Oil Co. 1 Martin Matthews, 22-18n-4w, north of the Simsboro field, Lincoln County, was drilling at 7,931 ft. in sand and lime. A drill-stem test at 7,810-31 ft., open 20 minutes, recovered 20 ft. of mud, with no shows.

Arkansas operations were picking up after being shut in or delayed by cold weather. In Columbia County, G. H. Vaughn 1 McCall estate, 30-17s-18w, was coring the Smackover at 7,638 ft. It ran electric log to 7,586 ft. Driller's top on the Smackover was 7,611 ft. Robert W. O'Mears et al 1 Moody, 12-16s-22w, was drilling in Cotton Valley at 7,180 ft.

In Hempstead County, Carter Oil Co. 1 Nora Carrigan, 18-13s-23w, was drilling at 3,519 ft. in chert, with no further shows past 2,445-57 ft. Placid Oil Co. 1 Modest estate, 35-13s-26w, had total depth in Smackover at 4,935 ft. A drill-stem test at 4,775-87 ft. recovered a slight show of oil. Tops logged were: Glen Rose 2,092 ft., Massive anhydrite 2,579-2,707 ft., Travis Peak 3,307 ft., Cotton Valley 3,950 ft., Buckner 4,596 ft., and Smackover 4,762 ft., on an elevation of 262 ft.

In Union County, Mul-Berry Oil Co. 1 J. E. Martin, 25-18s-15w, east of the South

El Dorado field, was drilling again below 2,123 ft. after making rig repairs.

In North Louisiana 17 new starts were reported, including 1 wildcat location each for Bienville, DeSoto and Union parishes. Field locations were: Caddo 1, Haynesville 1, Delhi 1, Ora 10 and Monroe 1. In the past few weeks, operations in Caddo and Ora were reversed, with the Ora field showing a cut-back in work, while Caddo has had intensive drilling. Field completions for the week were: Caddo 2 oil, D'Arbonne 1 dry, Homer 1 dry, Lisbon 1 distillate, Ora 3 oil and 2 dry, and Zeolle 1 dry.

Arkansas had 2 oil completions in the Cypress Lake field, and 1 dry hole in the Warnock Springs field. Two locations were reported in Arkansas: Stephens field 1, and a wildcat in St. Francis County.

ARKANSAS WILDCAT FAILURES

Columbia County: H. L. Hunt 1 Bodcaw Oil Co., NW SE 17-19s-22w, dry, TD 8,575 ft., Massive anhydrite 4,725-4,948 ft., elev. 257 ft.

Hempstead County: Placid Oil Co. 1 M. Modest, SW SW 35-13s-26w, dry, TD 4,935 ft., Saratoga 758 ft., Annona 996-1,122 ft., Tokio 1,425 ft., Paluxy 1,792 ft., Massive anhydrite 2,579-2,707 ft., Travis Peak 3,307 ft., Cotton Valley 3,950 ft., Buckner 4,596 ft., Smackover 4,762 ft., elev. 262 ft.

SOUTHWEST TEXAS

Starr County Gets New Oil Field

CORPUS CHRISTI.—A new oil field 2 miles north of Samfordyce field, Starr County, has been opened by Coastal Refineries, Inc., and W. D. Kennard 1 Louis Pena, Tract 151, in Porcion 38. On initial test this well flowed 60 bbl. of oil per day through a ⅛-in. choke. Total depth is 4,437 ft., with perforations at 4,366-70 ft.

The South Longhorn gas pool in Duval County was opened by Hiawatha Oil & Gas Co. 1-A Leroy Denman, in Santos Garcia Grant, 4 miles east of Realitos. Drilled to a total depth of 5,757 ft., this well flowed 10,000,000 cu. ft. of gas per day on open flow, with gas-condensate ratio of 54,000. Top of pay at 4,844 ft., with perforations for completion at 4,844-52 ft.

La Gloria Corp. 1 Adolph Moos, in Las Anacuas Grant to Vicente Ynojosa, 9 miles southwest of Ben Bolt, opened the new oil pool North Banders. On potential gage this well showed 2 bbl. of oil per day on jet, no water in evidence. Total depth is 6,520 ft., with perforations for completion at 6,234-46 ft.

Final potential gage has been reported for the new pool opener, Tide Water Associated Oil Co. 1 Guaranty Title & Trust Co., in Enrique Villareal Grant, Nueces County, located 4½ miles west-southwest of Corpus Christi, in the Saxet area. On test this well flowed 198 bbl. oil per day through a 5/32-in. choke with gas-oil ratio 3,500, tubing pressure 2,100 psi., casing sealed, with gravity 46.2°. Total depth 11,490 ft., with perforations at 11,115-170 ft.

O. W. Killam et al 1 Marrs McLean, wildcat in southeastern Webb County, 6½ miles southwest of Bruni, flowed gas with a spray of oil through perforations at 2,314-16 ft., using ¾-in. choke. Total depth is 2,658 ft., with 5½-in. casing set below 2,350 ft. No gage was made of the flow. Operators are still testing.

There were 27 new locations for District 4, with 4 being wildcat starts, 1 each in Duval, Nueces, San Patricio and Zapata counties. Eleven locations for District 1, with 5 being wildcats, 2 in Bastrop, and 1 each in Bexar, Calhoun and Edwards counties. Five successful exploratory wells were completed opening 3 new pools, South Longhorn gas pool in Duval County, North Bandera pool, Jim Wells County, and a new oil pool in Nueces County. Two new pays for proven areas were completed, 1 each in Cage Ranch field in Brooks County and North Sun field in Starr County. Five wildcats were dry, 1 each in Atascosa, Duval, La Salle, Starr and Williamson counties.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCATS

Brooks County: New gas-condensate pay, Cage Ranch field—Shell Oil Co., Inc., 2-C Jimmie Lenora Cage, in Leonardo Vargas Grant, top pay 7,800 ft., TD 8,348 ft., perf. 7,800-20 ft. and 7,848-68 ft., IP 138 bbl. per day condensate and 3,588,000 cu. ft. gas per day through a ¼-in. choke, 18,000,000 cu. ft. open flow, shut-in pressure 3,124 psi., gravity 59.2°.

Duval County: New gas pool, "South Longhorn"—Hiawatha Oil & Gas Co. 1-A Leroy Denman, in Santos Garcia Grant, A-1985, 4 mi. E. of Realitos, top pay 4,844 ft., TD 5,757 ft., perf. 4,844-52 ft., IP 10,000,000 cu. ft. gas per day on open flow, gas-condensate ratio 54,000, shut-in pressure 1,720 psi.

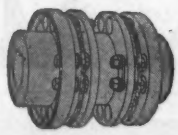
Jim Wells County: New oil pool, "North Bandera"—La Gloria Corp. 1 Adolph Moos, in Las Anacuas Grant to Vicente Ynojosa, 9 mi. SW of Ben Bolt, 6 mi. SW of Ben Bolt field and 2 mi. NE of Bandera field, top pay 6,234 ft., TD 6,520 ft., perf. 6,234-46 ft., IP 2 bbl. oil per day on jet.

Nueces County: New oil pool—Tide Water Associated Oil Co. 1 Guaranty Title & Trust Co., in Enrique Villareal Grant, 4½ mi. W-SW of Corpus Christi, in Saxet area, top pay 11,115 ft., TD 11,490 ft., perf. 11,115-170 ft., IP 198 bbl. oil per day through a 5/32-in. choke, GOR 3,500, TP 2,100 psi., casing sealed, gravity 46.2°.

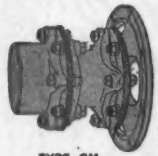
Starr County: New gas pay, North Sun field—Sun Oil Co. 1 Ramon Olivares

THOMAS Flexible COUPLINGS
ALL METAL
SPECIFIED WHEREVER 100% DEPENDABILITY IS DEMANDED

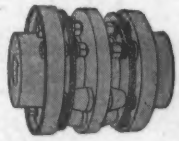
Refiners specify Thomas "Flexible" Couplings for PUMPS, COMPRESSORS, COAL PULVERIZERS, COOLING TOWERS and GENERATOR SETS.


TYPE DBZ-C

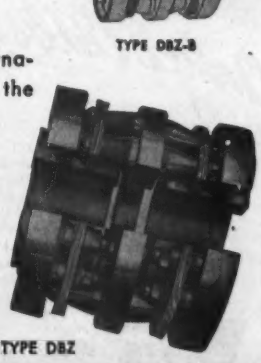
Pipe Line Men know that Thomas "Flexible" Couplings on their Low or High Speed Pumps give 100% dependable service.


TYPE CM

Drilling Engineers get the most out of their equipment with Thomas "Flexible" Couplings on Engine, Gear and Mud Pump Drives.


TYPE DBZ-B

In the Laboratory Thomas "Flexible" Dynamometer Couplings assure the greatest accuracy.


TYPE DBZ

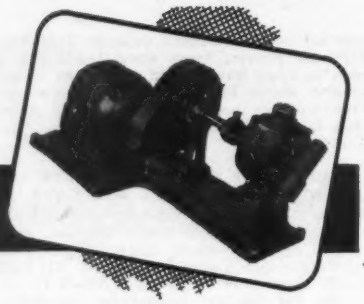
Thomas Flexible All-Metal Couplings Have No Wearing Parts. BACKLASH, FRICTION and CROSS-PULL ARE ELIMINATED.

NO LUBRICATION IS REQUIRED!

Write for the new Engineering Catalog

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

It Pays to Know
GENUINE
VIKING PUMPS



Know genuine Viking pumps and what they will do for you. They are the original in the rotary "gear within a gear" principle . . . the leader in the industry.

Remember, please, that Vikings are engineered for your job . . . they are ruggedly constructed, with no small, intricate parts or timing gears to get out of order. Vikings mean long, trouble-free pumping service. Look for the registered Viking trademark or name on every genuine Viking pump. These are your guarantee of Viking superiority.

Be sure, when you buy, that the pumps you get are genuine Vikings. Write and tell us about your pumping problem. Ask for Bulletin Series 47ST. It will be sent free immediately.

See Our Catalog In SWEETS

Viking PUMP COMPANY
Cedar Falls, Iowa

New HEAVY-DUTY ELECTRIC PLANT

5000 WATTS

Only 272 lbs!

5CK-115M
$545.00
FOB MINNEAPOLIS

• Large capacity, compact design, and lightweight aluminum construction are combined in this new, rugged, portable electric plant. Easily carried by two men. Powered by Onan 10 HP horizontally-opposed, two-cylinder, 4-cycle, air-cooled engine. Unusual operating economy. Shipped complete, equipped with four-receptacle outlet box and mounted in tubular-steel guard frame.

NEW ONAN CK ELECTRIC PLANTS are available in 5,000 Watts D.C., 115 and 230 volts; 2000 and 3000 Watts A.C. in all standard voltages.

ONAN ELECTRIC PLANTS—A.C.: 350 to 35,000 Watts in all standard voltages and frequencies. D.C.: 600 to 15,000 Watts, 115 and 230 Volts. Battery Chargers: 500 to 6,000 Watts, 6, 12, 32 and 115 Volts.

ONAN AIR-COOLED ENGINES—CK: 2-cylinder opposed, 10 HP. BH: 2-cylinder opposed, 5.5 HP. 1B: 1-cylinder, 3.25 HP.

Onan PRODUCTS

Write for Catalog

D. W. ONAN & SONS INC.
2740 Royalston Ave., Minneapolis 5, Minn.

ONAN ELECTRIC PLANTS

et al, in Santa Teresa Grant, top pay 4,496 ft., TD 6,835 ft., perf. 4,500-07 ft., IP 10,500,000 cu. ft. gas per day on open flow, shut-in pressure 1,900 psi.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Atascosa County: Hydro-Carbons Co. 1 Theo. Rogers, in James Lowe Sur. 1349, 2 mi. S of Kyote, dry, TD 3,703 ft.

Duval County: Edwin B. Cox & Jake L. Hamon & Geo. W. Coates 1-B Lucille Gruy Est., in J. Poitevent Sur. 153, 20 mi. S-SW of Freer, 2 mi. SE of Rancho Solo field, dry, TD 3,465 ft.

La Salle County: R. N. Ranger et al 1 Lois C. Koehne et al, HE&WT RR Sur. 738, 18 mi. SE of Cotulla, and 17 mi. SW of Washburn field, top Carrizo sand 2,870 ft., dry, TD 5,640 ft.

Starr County: Sun Oil Co. 13-A Chapotal Land Co., in Porcion 99, 15 mi. E of Rio Grande City, 2 mi. SE of Garcia field, dry, TD 6,005 ft.

Williamson County: Louis Henna et al 1 W. V. Alsabrook, in David Curry Sur., 2 mi. N of Round Rock, dry, TD 2,093 ft.

SOUTH LOUISIANA

New Deep Pay For Leeville Pool

NEW ORLEANS.—A new deep oil pay for Leeville Pool has been opened by The Texas Co. 5 City of New Orleans, 26-21s-22e. Drilled to a total depth of 13,468 ft., this well flowed an initial production gage of 146 bbl. of oil per day through a ¼-in. choke. Gas-oil ratio was 11,721, with tubing pressure 1,400 psi. Gravity 47.9°. Top of sand was encountered at 12,980 ft., with perforations for completion at 12,980-985 ft.

Final completion gage has been reported for new gas sand opener at Egan field, Sun Oil Co. and Sohio Petroleum 1 Kollitz Unit, 7-10s-1w, on south flank of the field. On potential test this well flowed 70 bbl. of fluid per day and 1,213,215 cu. ft. of gas per day through a ⅛-in. choke, gravity 36.8°. Total depth is 10,962 ft. and production is through perforations at 10,931-934 ft.

Stanolind Oil & Gas Co. 1-A D. C. Powell, wildcat exploration ¾ mile southeast of Sun Oil Co.'s Moss Lake discovery in Calcasieu Parish, is preparing to test. Total depth is 10,501 ft., and operators were plugging back to the 9,800 ft. level for tests. The 7-in. pipe is at 9,819 ft.

Gulf Refining Co. continues to test sands encountered in the 1 Cleobule Hernandez, wildcat test in Lafayette Parish, 18-10s-4e, 4 miles east-southeast of Duson field discovery. Hole was drilled to 12,950 ft. Production pipe was cemented at 12,198 ft. and numerous tests from the 12,000 ft. level up to the present testing level of 11,800 ft. have been made. Present test is at 11,700-810 ft.

The Texas Co. 6 State-Atchafalaya Bay, Lease 340, Belle Isle field area, St. Mary Parish, was drilled to a total depth of 15,549 ft. with no production. Operators are now cutting and pulling 8⅝-in. protection casing which was cemented in the hole to 10,844 ft.

All of the 16 new locations reported this week are in proven areas. The successful wildcats were completed to open gas sand in Egan field, Acadia Parish and deep oil pay in Leeville pool in Lafourche Parish.

SOUTH LOUISIANA SUCCESSFUL WILDCATS

Acadia Parish: New gas sand Egan field—Sun & Sohio 1 Kollitz Unit, 7-10s-1w, south flank of field, TD 10,962 ft., top sand 10,931 ft., perf. 10,931-34 ft., IP 70 bbl. fluid per day and 1,213,215 cu. ft. gas per day through ⅛-in. choke, gas-fluid ratio 17,332, TP 3,150 psi., gravity 36.8° gravity, 7 per cent salt water. Comp. 1-15-48.

Lafourche Parish: New deep oil pay Lee-

ville pool—The Texas Co. 5 City of New Orleans, TD 13,468 ft., top sand 12,980 ft., perf. 12,980-85 ft., IP 146 bbl. oil per day through ¼-in. choke, GOR 11,721, TP 1,400 psi., gravity 47.9°, no water.

ROCKY MOUNTAIN

N. Ant Hills Well Helps Powder River Basin Play

DENVER. — Ames Management's second test of the North Ant Hills area, Niobrara County, Wyoming, at No. 1 Government, NW SW 1-37n-63w, has found oil in the Newcastle sand and the operator is preparing to drill deeper in the sand. Top of the Newcastle was found at 4,876 ft. and at 4,879 ft., total depth, the hole filled 3,500 ft. of oil in 4 hours standing. The well was shut in for a short period and when opened to the tanks flowed by heads 21 bbl. of oil in 12 hours. This well is 12 ft. lower on the Newcastle than the extension test, 4 miles north of the Ant Hills well proper, drilled last year. The new test will be drilled deeper in the sand and completed. This well is located in the shore line area on the east side of the Powder River Basin, 40 miles southeast of the new Mush Creek producing area which is now being developed. Production is reportedly from the same horizon as the Mush Creek pool, with the result that some operators feel there is a possibility of production extending in lensed sands between the two areas. The land play throughout the eastern section of the Powder River Basin has extended solidly between these two fields, and north from Mush Creek to the Montana state line.

Ohio Oil Co., Husky Refining Co., and Tide Water Associated Oil Co. may be preparing to abandon the Porcupine Dome wildcat in Rosebud County, Montana, at 1 NPRR, NW NW NW 9-10n-39e. The well is reported drilling below 5,550 ft. and found the Cambrian at 5,084 ft. This well is located on one of the largest surface features in Montana, and it was previously doubted that the structure had been tested to the Madison. It is rumored that the operators may drill another test on the structure, but this report is not confirmed.

The Husky Refining Co. 5 Unit, NW NW SE 11-48n-102w, on drill-stem test of the Madison at 4,263-4,283 ft. recovered 100 ft. of 14.4°-gravity oil and 60 ft. of oil-cut mud in 30 minutes. Top of the Madison was logged at 4,219 ft. and this zone will probably be acidized before completion of the well in this horizon for a new pay in the field.

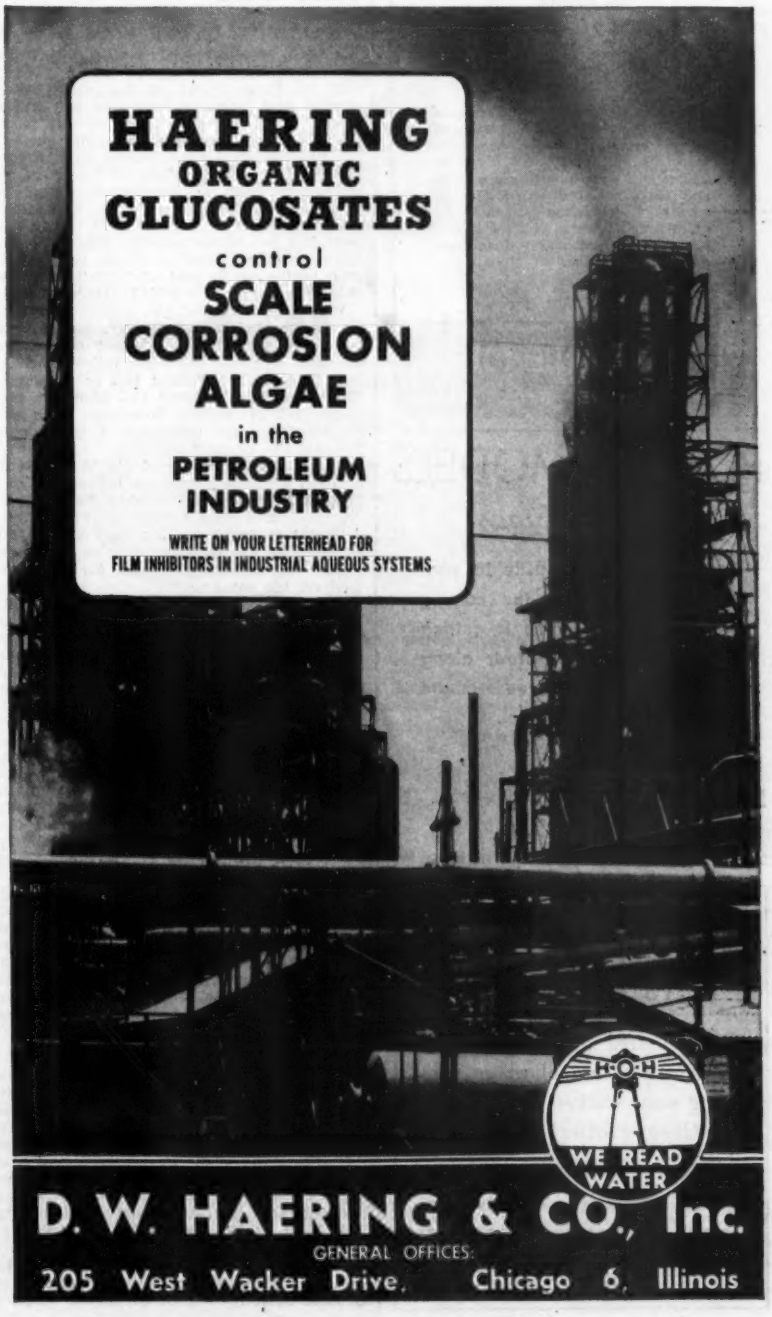
Seaboard Oil Co. of Delaware has plugged back 53-33 NPRR, NW SW NE 33-58n-100w, the wildcat test west of the Elk Basin field at Silver Tip, Park County, Wyoming. The well was drilled to 9,507 ft., total depth, in the Madison, which tested water. The operator cemented 7-in. casing at 8,590 ft., through the Phosphoria, and is now perforating casing for a thorough test of that horizon. The well showed oil in the Frontier (Peay) and Phosphoria, and on drill-stem test at 8,495-8,525 ft. made 800 ft. of oil with hydrogen sulfide gas. Another well at 64-33 NPRR, SE SW NE 33-58n-100w, is now spudding as a Frontier formation test.

In the important deep test at Boulder Knoll, Western Natural Gas Co., Byrd-Frost, Inc., and Paul B. English have found water in the Madison, and the well may be abandoned soon. The test is at 1 Redd, C SE NE 23-34s-25e, and topped Madison at 8,110 ft. On drill-stem test at 7,970-8,141 ft. the well made 25 stands of gas-cut mud with approximately 50 per cent of the fluid estimated to be gas. Another test at 8,145-8,205 ft. showed 1,860 ft. of salt water and no shows in 1½ hours. The well is now drilling below 8,400 ft., with contract depth at 8,500 ft. Shinarump was found at 2,560 ft., Hermosa 4,346, Paradox 5,697 and Molas 7,965 ft. Small shows of oil were reported in the Paradox but these were not believed commercial.

The operators at Boulder Knoll are making an intensive search for oil or gas throughout the San Juan Basin. Their well at Boundary Butte, along the Utah-Arizona state line, is now reported drilling below 4,960 ft. The well is No. 1 Tribal, NE NW 22-43s-22e, and several shows of gas have been found, with recoveries on drill-stem tests. The same companies are drilling below 2,280 ft. at 1 MacIntosh, NW NW 25-36n-18w, Montezuma County, Colorado, at McElmo Dome. Top of the Shinarump was found at 1,520 ft. in this well, with the test scheduled to go to 7,500 ft. Western Natural, Byrd Frost and P. B. English are now making location for a new test of the Dove Creek anticline in Northern Montezuma County, near the Utah state line. The well will be 1 Driscoll, CNL NE NW 3-38n-19w, and is scheduled to go to the Mississippian at around 8,000 ft. The San Juan Basin has been extremely active in exploration during the past 2 years, and the drilling program by these operators on well-known structures is the first wildcatting in the area in recent years.

New operations.—Thirty-seven new operations were reported, of which 20 were in Wyoming, 16 in Montana and 1 in Colorado. This large number of new locations for the area indicates that despite severe winter weather in parts of the Rocky Mountain region, operations will not be curtailed during the winter. Six of the new locations were extensions to the Mush Creek field in Weston County, northeastern Wyoming.

Completions.—There were 16 completions in the Rocky Mountains this week, with



PENBERTHY
AUTOMATIC
INJECTORS

The accepted method for assuring an uninterrupted supply of feed water to oil field boilers. Penberthy Automatic Injectors will supply feed water to boilers at minimum cost, are quickly and easily installed, reliable under most severe operating conditions, require little attention and no careful handling. Highest quality design and rugged construction.

PENBERTHY INJECTOR CO.
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

PLASTIC MODELS
Crystal Clear

Scale models in plastic to promote your sales in the coming world Oil Show. Time is getting short—send us your order along with your blueprint. Free estimate on your particular model.

ORDER TODAY

PLASTIC ENGINEERING CO. OF TULSA
227 W. Ninth St. Tulsa, Okla.

PIPE
TALLY BOOKS

One hundred joints with recap on each sheet in duplicate or triplicate sets. Pocket size. Special introductory offer! Five books, duplicate or triplicate sets only $3.00. Order today.

ROSS-MARTIN COMPANY
421 E. 4th ST. TULSA 1, OKLAHOMA

7 in Wyoming, 6 in Colorado and 3 in Montana.

COLORADO WILDCAT FAILURES

Freezout area, Baca County: Huber-Frontier 1 Heintz, NW NW NE 22-28s-50w, 3,933 TD, abnd., Dakota 0-220, Morrison 220, Triassic 520, Permian 950, Day Creek 1,110, Blaine 1,335, Stone Corral 1,695, Pennsylvanian 2,730, Lower Penn. 3,270, Mississippian 3,494, Viola 3,837, Arbuckle 3,915, elev. 4,638 KB.

North Craig, Moffat County: Carter Oil Co. 2 Unit, C NW NW 23-8n-91w, 3,725 TD, abnd., Ft. Union 2,450, Lance 3,443, Lewis 3,675, elev. 6,835 DF.

OHIO, KENTUCKY

Weather Slows Field Work

COLUMBUS.—For the second week the cold weather and gas shortage has brought drilling activity to nearly a standstill in large areas of the state. Wells started and locations approved are still at a high point and a surge of activity is expected when field conditions improve.

Hanley & Bird have started their second test in the wildcat block of leases in the northwest part of Brunswick Township, Medina County. The test is on E. L. Morton, Lot 1, and is a west offset to the first well. In the same county, Edson & Son have made an offset to their wildcat gas well in the south part of Litchfield Township. The location is 2 E. H. Miller, Lot 31.

Widespread leasing has spread over most of southeast Morgan County, and several tests will probably be drilled before any acreage is given up. Five miles north of John Morrow's proposed test in Meigsville Township, the Wittmer Co. plans to drill in Section 24, Bristol Township. Both will be Medina sand tests and a number of miles from production.

The Mid East Oil found gas in the Berea sand in a Clinton start on 1 Francis Love, Section 22, Madison Township, Perry County. The sand was topped at 975 ft. and drilled 1 ft. in where the gage was 725,000 cu. ft. The gas held up well and the machine was moved northeast for a second well on the same tract.

Only 7 locations from 5 counties were reported for the week. Morgan and Washington accounted for 2 each and Stark, Knox and Muskingum County 1 each. Twelve wells were completed with Brush Creek, Cambridge and Sandyville fields each having 3.

EASTERN KENTUCKY

ASHLAND.—Only one completion was noted on the eastern Kentucky activity sheet during the week, Pike County being the location. Kentucky-West Virginia Gas Co. Well No. 876, E. L. Pinson property, Pike, total depth 3,315 ft., was completed for 94,000 cu. ft. in shale.

New locations by Kentucky-West Virginia were No. 5790, Robert Damron, No. 894, J. S. Cline, No. 895, Dan W. Syck, et al, and No. 5787, Elisha Branham, all in Pike County; No. 5789, John H. Auxier, Johnson County; No. 5797, John W. Jones, Floyd County; No. 5799, Laban T. Minix, Magoffin County; and No. 5801, Simpkins Keathley, Floyd County.

WESTERN KENTUCKY

OWENSBORO.—Rex Alsworth has completed his test in the new Anton oil field of Hopkins County, the 1 Leni Loving, 1-K-25, as a gas discovery in the Tar Springs sand. With 5½-in. casing set at 2,300 ft. and alloy opposite the productive zone, the well flowed at the initial rate of 5,000,000 cu. ft. daily from a depth of 2,220-36 ft. Rock pressure was recorded as 975 lb. Total depth is 2,911 ft.

The Anton field, which is 6 miles northeast of Madisonville, was discovered in October 1947, by the O. O. Borden et al 2

"Best Bet Yet"
SAVE YOUR TUBING!

Tubing collars worn by contact with casing steal the profit out of pumping. Patterson-Ballagh Plastic Tubing Protectors prevent both collar and casing wear. Oil-proof, wear-resistant, insulating. They are pressed onto the collar under pressure and will not come off. Made in all sizes. End your tubing troubles. CALL in your Patterson-Ballagh man.

Specify "PAT-PAT"
PATTERSON-BALLAGH
A Division of Byron Jackson Co.
PLASTIC
TUBING PROTECTORS
1900 E. 65th Street LOS ANGELES 1
6247 Navigation Blvd. HOUSTON 11
330 Russ Bldg. SAN FRANCISCO 4
808 Graybar Bldg. NEW YORK 17

Standco
NO-SMOKE
STANDCO BRAKE LINING

Nothing novel—no bunk, but it gets the job done without scoring brake rims. See pages 3608-3613, Composite Catalog.

Standco Brake Lining Co.
HOUSTON

A CHOKE with
DIAMOND-LIKE
HARDNESS

RESISTS SAND ABRASION AND CORROSION

$13.50 All Sizes

ORDER TODAY

TEXAS PRODUCT ENGINEERING CO.
P. O. Box 6078 • Dallas, Texas

Whitfield, 1-K-25. Initial production of the discovery well was 64 bbl. of oil daily from the Tar Springs at 2,296 ft.

George Baker 1 J. D. Toben, SE NE SW 8-Q-40, Meade County, has been completed as an oil discovery at a total depth of 476 ft. Initial production was reported to be 5 bbl. daily. The 1 Toben is located approximately 3 miles south of the Rock Haven gas field and is far removed from other oil production, the nearest other oil wells being located approximately 30 miles to the west in Perry County, Indiana, and Hancock County, Kentucky.

WESTERN KENTUCKY SUCCESSFUL WILDCAT

Meade County: George Baker 1 J. D. Toben, SE NE SW 8-Q-40, pumped 5 bbl. daily, TD 476 ft.

WESTERN KENTUCKY WILDCAT FAILURES

Lincoln County: Putnam & Hobson 1 J. Martin, SE NE SW 7-L-58, dry, TD 1,826 ft.

Rowan County: Ashland Oil & Refining 1 John Caudill, NE NE SE 19-U-74, dry, TD 3,721 ft.

INDIANA

EVANSVILLE.—In an untested area just below Evansville, Johnston Drilling Co. has started a wildcat, the 1 Stanton L. Bryan, NW SW SE 5-7s-10w. The well is located in Vanderburgh County, Indiana, but the lease block extends over into Henderson County, Kentucky.

In Gibson County, the V-T Drilling Co.-J. C. Haynes 4 Fannie Gibbs Putnam et al, W½ SE NE 26-1s-12w flowed 90 bbl. of oil through casing in 3 hours from the Cypress at 1,952-70 ft. The 5 Fannie Gibbs Putnam, also in the NE of 26-1s-12w, cored the Cypress at 1,952-85 ft. and recovered 6 ft. of shale and 12 ft. of saturated sand.

INDIANA SUCCESSFUL WILDCAT

Gibson County: C. M. Amsler 1 Mary Witherspoon, SW SW NW 26-2s-10w, IP 20 bbl., TD 2,035 ft.

INDIANA WILDCAT FAILURES

Hamilton County: F. B. Cline 1 C. Goff, NW SW SE 18-19n-4e, dry, TD 1,038 ft.

MISSISSIPPI

Oldenburg Well Making Production Tests

JACKSON.—Danciger Oil & Refining Co. 1 Stark McKinney, et al, 25-7n-2e, at Oldenburg, Franklin County, is making production tests through perforations at 10,538½-539½ in the Massive sand. After running 2½-in. tubing to 10,490 ft. mud was displaced with water and water with oil and well opened to start testing on January 29, 1948. In first 14 hours the well flowed 88 bbl. of wash oil through 7/64-in. tubing choke with tubing pressure increasing from 250 psi. to a maximum of 2,100 psi. During the 24-hour period which followed varying percentages of salt water were noted, reaching a maximum of 70 per cent at times. Choke was reduced to 6/64 in. and tubing pressure declined to a minimum of 675 psi., going back to 950 psi., and for last 18 hours shakeouts have ranged from 15 to 27 per cent salt water.

Gulf Refining Co. 2 R. W. Trotter, on Brownsville Dome, Hinds County, has been abandoned. Top of salt was encountered at 4,693 ft. Total depth 4,701 ft. in salt.

Two wildcat starts were reported this week, one each in Covington and Lincoln counties. Two development locations were shown, one each in La Grange field, Adams County, and Mallalieu field in Lincoln County. One wildcat failure was completed in Hinds County.

MISSISSIPPI WILDCAT FAILURE

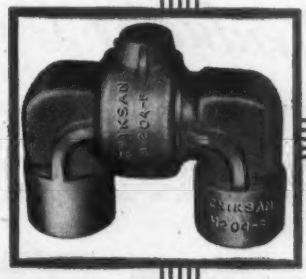
Hinds County: Gulf Refining Co. 2 R. W. Trotter, NW NE 15-7n-2w, dry, TD

For a **WINNING COMBINATION**

WHEREVER YOU USE FLEXIBLE LINES

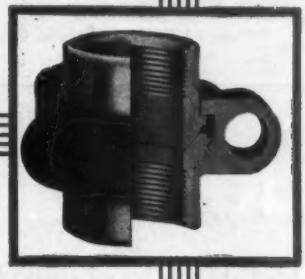
When you fit up swing lines, you want perfect flexibility with low torque, dependable unions and a lubricant that will prevent threads from rusting and freezing. You get all THREE of these advantages with the CHIKSAN-WECO Combination.

CHIKSAN Ball-Bearing Swivel Joints turn on double rows of ball bearings. That means smooth, easy action with low torque. There is nothing to tighten or adjust. That means low maintenance cost. CHIKSAN Packing Units are designed for many different services and pressures. That means dependable service.



CHIKSAN Ball-Bearing SWIVEL JOINTS

WECO WING UNIONS



WECO Wing Unions are made in a wide range of types and sizes for pressures to 12,000 psi. Thoroughly tested and widely accepted by the Petroleum Industry, under the most severe conditions, WECO Wing Unions are now available to users in all lines of industry.

WECO Thread Lubricants provide a perfect seal and complete protection against rust and corrosion. They do not harden under any conditions. Lines are easily set up or dismantled without injury to threads or fittings.

WECO THREAD LUBRICANTS

Representatives in all Principal Cities

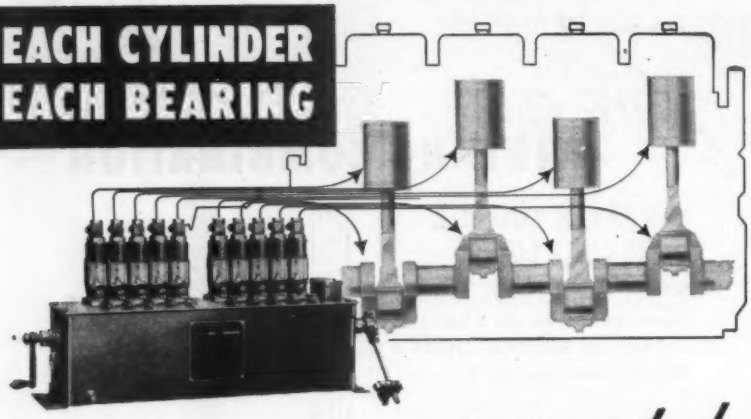
WELL EQUIPMENT MFG. CORP. HOUSTON 1, TEXAS
MID-CONTINENT AREA

CHIKSAN EXPORT CO. BREA, CALIFORNIA • NEW YORK 7
EXCLUSIVE EXPORT REPRESENTATIVE

CHIKSAN TRADE MARK
BALL-BEARING SWIVEL JOINTS FOR ALL PURPOSES

CHIKSAN COMPANY
BREA, CALIFORNIA
New York 7 Houston 1

EACH CYLINDER EACH BEARING



Individually Lubricated

BY faithfully delivering precise amounts of oil to cylinders, bearings, and other points of friction, Manzel Lubricators save engine owners up to 60% in reduced oil consumption and lowered maintenance costs. Write for further information.

Manzel Inc. now supplies repair parts for all models of Bowser and Torrington Lubricators.

Builders of HIGH PRESSURE METERING PUMPS Since 1898

Manzel INC.

A Subsidiary of Frontier Industries, Inc.

336 Babcock Street Buffalo 10, N. Y.

This is under no circumstances to be construed as an offering of this Capital Stock for sale, or as an offer to buy, or as a solicitation of an offer to buy, any of such Capital Stock. This Stock is initially being offered by the Company to its Stockholders and such offering is being made only by means of the Offering Prospectus.

NEW ISSUE

January 29, 1948

2,269,050 Shares

Gulf Oil Corporation

Capital Stock

(Par Value $25)

Rights, evidenced by Subscription Warrants expiring 3 P.M., Eastern Standard Time, February 10, 1948, to subscribe for these shares at $51 per share have been issued by the Corporation to its Stockholders, as more fully set forth in the Offering Prospectus.

Prior to the expiration of the Warrants, the Underwriters will offer Capital Stock, purchased or to be purchased by them, at an offering price which shall be no more than the last sale price of the Stock on the New York Stock Exchange in the last preceding 24-hour period nor less than $51 per share. The offering price may be varied each 24-hour period but, it is intended, shall not be varied within any such period except that it may be reduced.

Copies of the Offering Prospectus may be obtained from any of the several Underwriters, including the undersigned, only in States in which such Underwriters are qualified to act as dealers in securities and in which such Prospectus may legally be distributed.

The First Boston Corporation

Blyth & Co., Inc.	Eastman, Dillon & Co.	Glore, Forgan & Co.
Goldman, Sachs & Co.	Harriman Ripley & Co. Incorporated	Kidder, Peabody & Co.
Lazard Frères & Co.	Lehman Brothers	Merrill Lynch, Pierce, Fenner & Beane
Smith, Barney & Co.	Stone & Webster Securities Corporation	Union Securities Corporation

For Your Next Job

STOP and CONSIDER the

FLEXIBILITY

of the

Peerless Vertical Turbine Pump

1. AS A DEEP WELL PUMP

For a dependable source of clean water, Peerless Vertical Turbine Pumps are recognized leaders in the field; noted for their adaptability to widest pumping conditions. Install these deep well pumps with the type of drive most suitable to your application. Capacities from 15 to 30,000 g.p.m. are obtained from all practicable depths.

2. AS A CLOSE-COUPLED PUMP

You're assured of full turbine pump utility and capacities with an extremely compact installation. Ideal for pumping from short or medium settings; capacities up to 30,000 g.p.m. are delivered from sumps, pits and surface water sources. For booster service, circulating, de-watering and a host of other applications.

3. AS AN APPROVED FIRE PUMP

Install this versatile Peerless Vertical Turbine type Fire Pump, with proper fittings, for a permanent and reliable water supply for adequate plant fire protection. *Underwriters approved*, these pumps produce from 500 to 2000 g.p.m. against heads to 285 ft. Extremely simplified in piping arrangement.

Engineering Information Available on All Three Vertical Turbine Types

Write to nearest office stating what your pumping conditions are; give diameter and depth of well, distance to water, capacity desired, total head, type of lubrication (oil or water) and type of drive. The bulletin that specifically describes the pump to fit your specific needs, together with appropriate engineering data will be furnished. Plan with Peerless Vertical Turbine Pumps!

fmc PEERLESS PUMPS

PEERLESS PUMP DIVISION

Food Machinery Corporation

Factories: Los Angeles 31, Calif.; Quincy, Ill.; Indianapolis, Ind. *District Offices:* Chicago 40, 4554 N. Broadway. Philadelphia Office: Suburban Square, Ardmore, Pennsylvania; Atlanta Office: Rutland Building, Decatur, Georgia; Dallas 1, Texas; Fresno, California; Los Angeles 31, California

4,701 ft. Electric log tops: Anhydrite 4,514 ft., salt 4,693 ft.

ALABAMA WILDCAT FAILURE

Barbour County: Robert York, Trust 1 S. V. Dismuke, SW NW SE 16-12n-27e, dry, TD 2,727 ft. in hard lime.

TEXAS GULF COAST

Wilson County Test Completed at 592 Ft.

HOUSTON.—W. C. McBride, Inc. 1-A C. E. Hart, shallow discovery well of Hart field, Wilson County, has been completed in the Reklaw zone with a potential gage of 19.14 bbl. of net 16.8°-gravity oil per day on the pump, plus 85.5 per cent fresh water. Total depth is 592 ft., with production through perforations at 586-88 ft. Top of pay zone 587 ft. No gas accompanied the production. This well is in Simon & Juan Arocha Heirs Grant.

Gas-condensate production has been extended at Kittie West field, Live Oak County, by Continental Oil Co. 2-A Kittie West Schreiner. Drilled to a total depth of 7,503 ft., this well was completed in the Slick sand, perforations at 6,740-48 ft., flowing an initial production of 22 bbl. of condensate per day and 964,000 cu. ft. gas per day through a 5/32-in. choke. Tubing pressure 1,375 psi. Gravity is 45.3°.

Continental 1-A Frank C. Goodwin, in Juan Giminez Survey, approximately 1½ miles north-northeast of George West townsite, Live Oak County, has opened new gas-condensate pay in Harris field. On potential test the well flowed 28 bbl. of condensate per day and 2,946,000 cu. ft. gas per day through a 9/64-in. choke. Production is through perforations at 8,588-8,610 ft. and 8,627-37 ft. Total depth is 8,750 ft.

New oil sand for South Pierce Junction field, Harris County, has been opened by McCarthy Oil & Gas Corp. 1 Vivian Smith, in Jas. Hamilton Survey, Section 53. Top of new sand 7,358 ft., with perforations at 7,360-67 ft. On potential test the well flowed 227 bbl. oil per day through 9/64-in. choke, gravity 32.3°. Total depth is 7,630 ft.

In DeWitt County, just north of the extreme north corner of Goliad County, and 4½ miles west-northwest of Meyersville, the new "Holly" oil field has been opened by Holly Development Co. 1 George Stanchos, gaging 84.75 bbl. of oil per day through perforations at 7,510-13 ft. Total depth is 7,612 ft. with 5½-in. casing on bottom.

There were 13 new locations for District 3, 2 being wildcats, 1 each in Orange and San Jacinto counties, while 10 locations were reported for District 2 with no wildcat starts. There were six successful wildcats completed in Districts 2 and 3, one new oil pool for Goliad, new pays, one each for Harris field, Live Oak County; North La Rosa pool, Refugio County; and South Pierce Junction in Harris County. Two fields were extended, one being Village Mills field in Hardin County and the other Kittie West field in Live Oak County. Seven wildcat failures were reported, three in Calhoun, one each in Karnes, Live Oak, Jefferson and Wharton counties.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Calhoun County: Quintana Pet. Corp. 11 J. and H. C. Wehmeyer in Maximo Sanchez Grant, 1½ mi. NW of Port Lavaca, dry, TD 8,383 ft.

Salt Dome Oil Corp. 1 State Tr. 103, Matagorda Bay, 6 mi. N of Port O'Connor and 1 mi. N of Matagorda Bay field, dry, TD 5,819 ft.

Texas Co. 1 Chas. E. Peterson, in Sam Houston Lge., 3½ mi. N-NW of Olivia, dry, TD 8,415 ft.

Jefferson County: Voyles Prod. Co. 1 Bennette C. Germain, in Jos. Grigsby Sur., Block 3, 3 mi. NE of Port Arthur Townsite, dry, TD 401 ft.

Karnes County: George W. Graham 1 John Wendt, in Brooks & Burleson Sur. 1, 4 mi. SE of Runge Townsite, dry, TD 7,038 ft.

Live Oak County: Pan American Prod. Corp. 1 A. A. Dun, 6 mi. E of Oakville, dry, TD 8,578 ft.

Wharton County: H. L. Hunt 1 Thos. Flaxman, in I. Woods Sur., 2 mi. W of El Campo Townsite and 2¼ mi. S of South Hutchins production, dry, TD 6,508 ft.

TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCATS

Goliad County: New oil, "Charco"—W. C. McBride, Inc. et al 1-B W. A. Stockton, in Victor Blanco Grant, A-7, 2 mi. SW of Charco, and 3 mi. N-NE of Hord's Creek field, top poy 4,590 ft. (Yegua zone), TD 8,511 ft., perf. 4,590-95 ft., IP: 33 bbl. oil per day through a ½-in. choke, GOR too low to measure, TP 5 psi., casing sealed, gravity 48.6°.

Hardin County: Extension to Village Mills field—Houston Oil Co. of Texas et al 2 Rice Institute, in Chas. Stewart Sur., 7,500 ft., W-SW of production in Village Mills field, TD 10,636 ft., top sand 9,025 ft., perf. 9,025-37 ft., IP: 84 bbl. oil per day through a 10/64-in. choke, GOR 523, TD 425 psi., gravity 35.4°.

Harris County: New oil sand, South Pierce Junction—McCarthy Oil & Gas Corp. 1 Vivian Smith, in Jas. Hamilton Sur., Sec. 53, TD 7,630 ft., top sand 7,358 ft., perf. 7,360-67 ft., IP: 227 bbl. oil per day through 9/64-in. choke, GOR 558, TP 1,000 psi., CP 1,350 psi., gravity 32.3°.

Live Oak County: New gas-condensate pay, Harris field—Continental Oil Co. 1-A Frank C. Goodwin, in Juan Giminez Sur., approximately 1½ mi. N-NE of Geo. West Townsite, top pay 8,588 ft., TD 8,750 ft., perf. 8,588-8,610 ft., and 8,627-37 ft., IP: 28 bbl. condensate per day and 2,946,000 cu. ft. gas per day

Saves 3 ways

- No sandblasting or chemical dissolvers are required. Wire brush to remove rust scale, dirt, etc. Dip, brush or spray!
- Rust-Oleum goes on 25% faster...covers 40% more area per gallon.
- Depending on conditions, Rust-Oleum outlasts ordinary materials two to ten times.

MAIL THIS COUPON TODAY FOR FULL INFORMATION

LASTING PROTECTION FOR METAL

Rust-Oleum seals rustable metal surfaces against the ravages of rain, dampness, corrosive fumes, salt air, and other destructive, rust-forming conditions. It adds years of extra service to all metal—*at a material cost of less than 1-cent a square foot.* Many refineries now use Rust-Oleum because it outlasts ordinary protective materials two to ten times. Rust-Oleum can be applied over metal already rusted. It penetrates every pore of the metal surface and merges the remaining rust into the protective film — a water-tight, air proof, rust-resistant coating that does not blister, crack or peel.

RUST-OLEUM CORPORATION

2469 Oakton Street — Evanston, Illinois

Please send me a free copy of the new Rust-Oleum Catalog showing color selection, recommended uses and prices.

Name.....

Company.....

Address.....

Town..... State.....

through a 9/64-in. choke, TP 3,440 psi., casing sealed, gravity 46.2°.

New gas-condensate extension to Kittie West field—Continental 2-A Kittie West Schreiner, in D. R. Fant Sur. 6, 3 mi. S of Kittie, top pay 6,740 ft., Slick sand. TD 7,503 ft., perf. 6,740-48 ft., IP: 22 bbl. condensate per day and 964,000 cu. ft. gas per day through a 5/32-in. choke, TP 1,375 psi., casing sealed, gravity 45.3°.

Refugio County: New gas-condensate pay, North La Rosa field—Phillips Pet. Co. 2 J. G. Toland, in Johnson & Pugh Subd. of Bonnie View Ranch, Guadalupe C. Cobian Grant, dual completion, top pay 5,616 ft. (new sand), TD 6,280 ft., perf. 5,616-24 ft., IP: 971,000 cu. ft. gas per day and 29 bbl. condensate per day, through 3/16-in. choke, or 3,800,000 cu. ft. gas per day open flow, top pay 5,835 ft., TD 6,280 ft., perf. 5,835-42 ft., IP: 42 bbl. condensate per day and 1,180,000 cu. ft. gas per day through a ¼-in. choke, TP 2,025 psi.

APPALACHIAN FIELD

Third Deep Test Started In Eastern W. Virginia

PITTSBURGH.—On the Blackwater anticline in Dry Fork district, Tucker County, West Virginia, Cumberland & Allegheny Gas Co. has made a location for a deep test on the West Virginia Power & Transmission Co. tract starting at an elevation of 3,296 ft. This will be the third test to the Oriskany on that eastern Appalachian structure both of which were completed as good gas wells in the Oriskany. The first test was started with cable tools but completed with a rotary. The second was drilled with rotary. This third test will be drilled with cable tools, the contractor being Arlie Fox who has had an extensive experience in deep cable tool drilling. It is believed that some upper Devonian sands may best be explored with cable tools as well as the shales where several fair shows of gas appeared in the other two tests. The location for the new test is 6,950 ft. northeast of the first test, No. 1 Kaemmerling.

In Shady Springs district, Raleigh County, Godfrey L. Cabot, Inc., struck a volume of salt water at 6,986 ft. in the important wildcat on Russell & Doloff which rose 300 ft. in the hole with no additional footage. From a surface elevation of 1,999 ft., the Corniferous lime had been logged at 6,908 ft. so it is assumed that the water is from the top of the Oriskany which has not yet been logged.

In Ripley district, Jackson County, from a surface elevation of 964 ft., Godfrey L. Cabot, Inc., topped the Corniferous lime at 5,105 ft. in No. 1254 Dolly Casto.

New locations in the state totaled 14 and in Sherman and Washington districts, Calhoun County; Poca district, Kanawha County; Harts Creek district, Lincoln County; Logan and Tridelphia districts, Logan County; Grant district, Nichols County; Richland district, Ohio County; Jefferson district, Pleasants County; Murphy district, Ritchie County; Warren district, Upshur County; Huff Creek and Oceana districts, Wyoming County.

In East Fallowfield Township, Crawford County, northeast Pennsylvania, Sylvania Corp. logged the Tully lime at 3,080 ft., Onondaga 3,235 ft., Oriskany 3,430-48 ft., in the wildcat on Ellen Calvin farm with salt water rising 2,000 ft. in the hole from the sand.

SOUTHWEST PENNSYLVANIA WILDCAT FAILURES

Washington County, East Pike Run Township: Metro & Batykefer 1 Erwin Williams, dry, Fifth sand, TD 2,800 ft.

Paul Noach, dry, TD 2,963 ft.

Somerset Township: Arthur Chivers 1

CANADIAN FIELDS

Woodbend Well May Be 3½-Mile Leduc Extension

CHATHAM.—Extending the Leduc field 3½ miles to the north, Imperial-Woodbend 1, LSD 5, 15-51-26w4, is being completed with flush production at a rate in excess of 2,200 bbl. daily, comparable to the largest producers in the Leduc area. The water level was found at 5,340 ft. and after plugging off, fluid was swabbed down to 3,600 ft. when the well blew in under its own power. Accompanying a measured gas flow of 1,225,000 cu. ft. a day, the well averaged 93 bbl. an hour on an 8-hour run. It was pinched down to 65 bbl. an hour with 400 psi. on the tubing till all storage was filled, then shut in.

Geologists believe that Woodbend is part of a continuous field and not a new area, since the water level at 5,340 ft. corresponds closely with water-levels in the Leduc field, though the two producing areas may be on the flanks of a slight rise. This would indicate a field approximately 8 miles long and 5 miles across, covering nearly 20,000 acres with potential recovery of 200,000,000 bbl. of oil.

Bantry Lake.—In the Bantry Lake area, southern Alberta, California Standard-Imperial in LSD 11, 2-18-13w4, drilled originally to 4,824 ft. and plugged back, is being placed on production after setting 7-in. casing at 3,316 ft. and perforating with four shots per foot at 3,253-59 ft. Oil tests 24.7° gravity and will be produced at about 150 bbl. daily. The well opens a new producing area 100 miles south and east of Calgary. A second joint test is starting in LSD 1, 11-18-13w4.

Ontario.—In Dover Township, Kent County, Ontario, a deep test drilled jointly by Imperial Oil and Union Gas Co. near the

"I'll take the WHITE one every time!"

WYTEFACE "A" Trade Mark
Steel Tapes for the Oil Industry

WYTEFACE "A" Steel Tapes have raised black graduations on a crack-proof white surface. Easy to read in any light, from any angle. Designed for hard service. Resist rust and corrosion. Raised rims and markings protect the white background from abrasion from rails, pipe, rocks, concrete. Made in styles especially for Oil Riggers, Oil Gaugers and for general measurements. See your supply house, or write for details to Keuffel & Esser Co., Hoboken, New Jersey.

KEUFFEL & ESSER CO.
EST. 1867
NEW YORK • HOBOKEN, N. J.
Chicago • Detroit • Los Angeles
St. Louis • San Francisco • Montreal

Do you have these
WALL MAPS?

PIPE LINE WALL MAP OF THE U. S.— 31 x 48 inches, printed in four colors. Shows all the crude oil and products trunk lines in the U. S. with the names of the owners given in each case. Published September, 1946. Price $1.00.

JOURNAL GUIDE TO WORLD OIL— 36 x 48 inches, printed in four colors. A handsomely illustrated map of the world, showing the various oil producing areas, refineries, pipe line and tanker routes, surrounded by enlarged maps of the major oil producing countries with important facts and figures. Published January, 1947. Price $1.50.

JOURNAL GUIDE TO GULF COAST OIL— A handsome 36 x 48 in. wall map printed in five colors. Shows locations of all oil and gas fields, all refineries, the inland waterways system, and other facilities. Carries a complete list of the Gulf Coast oil and gas fields, a list of refineries by towns, a list of the natural gasoline and cycling plants by fields, and a list of terminals. Published May 31, 1947. Price $1.50.

Send your order and payment direct to

THE OIL AND GAS JOURNAL
P. O. Box 1260 Tulsa, Oklahoma

village of Electric, 5 miles due south of Wallaceburg, has encountered gas at 3,987 ft. Production, coming from the basal Paleozoic sand on top of the pre-Cambrian, is around 600,000 cu. ft. A second well will be drilled. The producer is north and east of the former Trenton gas and oil field in Dover West near the mouth of the River Thames, first opened by Union Gas Co. in 1917.

CALIFORNIA

Big Well Revives Lawndale Interest

LOS ANGELES.—The nearly dormant Lawndale field in Los Angeles County came suddenly to life this week when Seaboard Oil Co.'s 81-20 Pauley-Seaboard deep test in 20-3s-14w was turned to tanks flowing an undetermined volume of oil and considerable gas from a depth of 7,996 ft. Seaboard is withholding all information about the well except that it is producing "high gravity oil." Shut-in pressures before the well was put on production were reported to be 2,500 psi. on the casing and 2,700 psi. on the tubing.

The well is believed to be producing from the Schist formation. It is doubted that it can be considered a new pool discovery since Seaboard brought in its 1 Johnson in 17-3s-14w, ¾ mile to the northwest, from the Schist last August. The new well, better located, is presumed to be producing from the same accumulation. The Johnson well produced initially about 200 bbl. of oil and considerable water from a depth of 7,900-7,980 ft.

The lease on which the latest well was drilled was acquired last year by Ed Pauley who made a deal with Seaboard to drill the well. Originally it belonged to Smith Development Co. and was one of the few leases in the old Lawndale field which produced any oil. The field, discovered in 1928, was one of the greatest duds in California oil history. Out of a total of 64 wells drilled only 7 produced oil, the balance being dry holes.

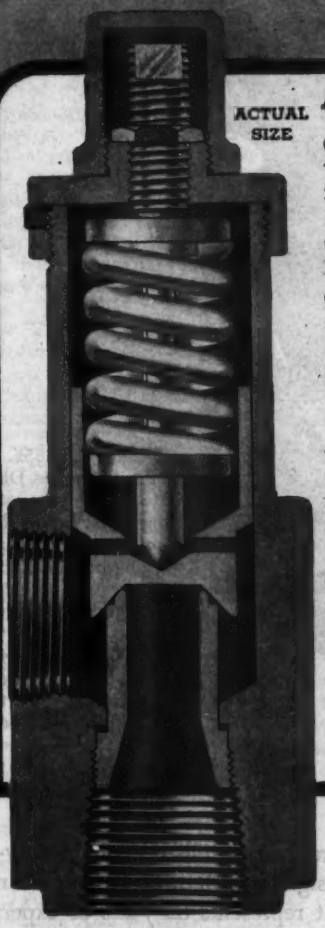
Barnsdall Oil Co.'s 68 Rancho San Francisco, offsetting General Exploration Co.'s 3 Ferguson, southeast extension well of the Newhall Potrero field, Los Angeles County, was an impressive completion of the week and spotlighted this end of the field. Barnsdall's well flowed at a 400-bbl. rate, making 47° gravity, clean oil through a 20/64-in. choke and is a better producer than the General Exploration Co.'s outpost discovery. Both wells are in 36-4n-17w.

Two dry holes in one week tend to indicate that the productive area in the recently discovered field in the Cuyama Valley area of San Luis Obispo County will be limited. E. Jorgensen's 1 Indian on Sec. 23-11n-28w and an extension test drilled by Cuyama Oil Co., on Sec. 25, failed to find the pay discovered several weeks ago by Norris Oil Co. in its 2 Cuyama, also in Sec. 25, at approximately 1,900 ft. Latest gage on the latter well is 85 bbl. of 21° gravity oil, 15 per cent cut, through a 7/64-in. choke. Locations have been staked for two additional tests on Sec. 26 by Gene Reid Drilling, Inc., and Pacific Continental Oil Co.; while F. R. Anderson and Associates are rigging up to drill 1 Hadley on Sec. 25.

Standard of California's 73-30V Eocene discovery well on the Middle Dome of Kettleman Hills, 30-23s-19e, was producing less water the past week, the cut having declined from 12 per cent to 8 per cent. Oil production is 175 bbl. daily of 45.5° gravity oil through a 11/64-in. choke. Standard issued a statement recently that the well had cost $1,000,000 and that it considered the discovery important.

Standard of California continues to fish for drill pipe in its near-record deep well, 1 Maxwell, in the Montalvo area of Ventura County, 23-2n-23w. With total depth

HIGH CAPACITY
LOW COST
SMALL NOZZLE-RELIEF VALVES
For Pressures to 10,000 psi.
Available from Stock
IN STAINLESS STEEL, STEEL AND BRASS


ACTUAL SIZE

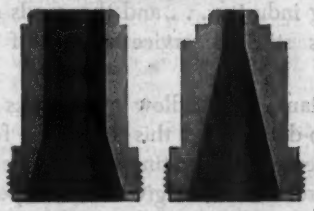
A Tight Relief Valve!

- Top-guided disc-piston with two-point bearing surface always assures perfect seating, smooth action and definite operation at the set pressure.
- Certified full capacity achieved by high disc lift developed by utilizing the full force of the nozzle flow. Result: Smaller body size required for given capacity.
- Nozzle seat well above the drain line prevents accumulation of scale or sediment and assures full free opening.
- All parts are machined from forged bar stock . . . brass, cold-rolled or stainless steel . . . which permits compact design with sound metal in all parts. All nozzles and discs are of stainless steel.

Investigate the savings possible with the Type 2745 Valve. Further detailed data is available on request . . . without obligation.

DIMENSIONS

Size in.	Nozzle Area sq. in.	Max. Pres. psi.	Overall Height in.
½	0.077 0.019	2000 10000	5¼
¾	0.077 0.019	2000 10000	5¼
1	0.250 0.045	2000 10000	6⅞

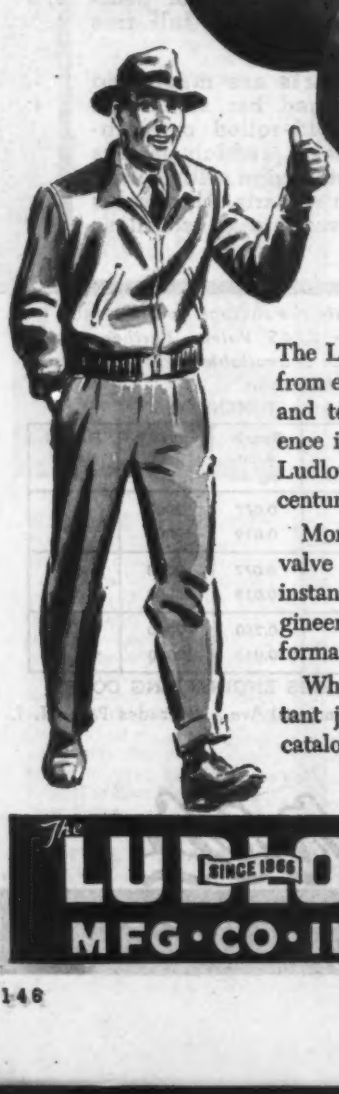

2 NOZZLE SIZES FOR EACH BODY SIZE.

FARRIS ENGINEERING CORP.
412 Commercial Ave., Palisades Park, N. J.

Farris
SAFETY and RELIEF VALVES
FARRIS keeps pace with advancing power and process engineering
1005

"That's what I look for on a Valve"

Ludlow List 55½. Flanged, Double Disc Gate Valve with non-rising stem. Iron body, bronze mounted. Steam working pressure: 250 lbs. sizes up to 12". Cold working pressure: 500 lbs. sizes up to 12"; 400 lbs. sizes 14" to 36". Test pressure: 1000 lbs. sizes up to 12"; 700 lbs. sizes 14" to 36".



The Ludlow trade-mark tells the whole story—from expert design through careful manufacture and testing. It represents 82 years of experience in serving industry . . . and thousands of Ludlow valves still in service after half a century.

More important, the Ludlow oval marks a valve as up-to-date. Like this List 55½, for instance. Modern, incorporating the latest engineering improvements, it gives better performance, easier packing and longer life.

When you're selecting a valve for an important job, look for the Ludlow oval. Send for catalogs.

OV-2

The LUDLOW VALVE
SINCE 1866
MFG·CO·INC·TROY·N·Y·

17,696 ft., the company has decided to "shoot and pull."

CALIFORNIA WILDCAT FAILURES

Kern County, Comanche Point area: Richfield Oil Corp., 10-1 S.P., 25-13n-19w, dry, elev. 558 ft., Santa Margarita 6270 ft., TD 7605 ft.

Semitropic gas field: Standard Oil Co., 1-1 Semitropic Unit, 5-27s-23e, dry, elev. 259 ft., TD 4400 ft.

Los Angeles County, Val Verde area: The Texas Co., 1 Malis, 10-4n-17w, dry, elev. 1,267 ft., TD 8,411 ft.

PERMIAN BASIN

Big Silurian Well At Dollar Hide

MIDLAND.—Record production from two development wells, important extension wells showing for production, and deep distillate pay in a Pecos County wildcat featured the week's developments in this area.

Pure Oil Co. and Humble Oil & Refining Co. 3-E-A E. P. Cowden, on the north side of the Dollar Hide field, Andrews County, rated the field's highest potential when it made a natural flow from the Silurian of 75 bbl. of oil in 10 minutes, or at the rate of 450 bbl. an hour. The flow was through ¼-in. choke, coming from open hole between 8,532-40 ft. Operators were said to have been trying to fill a cavernous section with mud to regain circulation, when the oil was found.

As a result of the production indicated, operators plan to complete the well in the Devonian and Silurian instead of continuing to the Ellenburger as originally planned. Total depth is 8,610 ft., with pipe set to 8,503 ft. The Devonian was scheduled to be tested between 7,628-90 ft.

Previous reports of the well, as yet unconfirmed, indicated it flowed to pits at an estimated 1,000-1,500 bbl. an hour. Gravity of oil is 43°, and gas-oil ratio on the 10-minute flow was around 300 cu. ft.

The largest producer for the Jordan 4,500-ft. field of northern Crane County was reported at The Texas Co. 1 Jennie McKnight, Section 30, Block B-16, PSL Survey. After an acid treatment, the well kicked off and flowed 592 bbl. of fluid in 22 hours, cutting 32 per cent acid water at the start and only 2 per cent at the end. The well is bottomed at 4,675 ft. It is one location west of the discovery, which rated 299 bbl. of oil a day.

C. W. Chancellor, Slick Oil Co. et al 1 Thornton Davis, northern Pecos County test, showed gas and distillate on a 45-minute drill-stem test of the Ellenburger from 9,115-75 ft. Gas showed at the surface when the tool was opened. It unloaded some mud, then started making gas and a spray of distillate; the spray becoming heavier toward the end of the test. Gas volume has been estimated from 3,000,000 to 20,000,000 cu. ft. a day. When pipe was broken down, approximately 90 ft. of distillate was recovered. Top of the Ellenburger was 8,790 ft., on an elevation of 2,480 ft. Location of the well is NW SE Section 105, Block 8, H&GN Survey, and 2 miles west of the Pecos Valley shallow field.

In Andrews County the Shafter Lake Devonian field had a prospective extension well at Frank and George Frankel 1-C University, NE SW Section 25, Block 13, University Lands, when it flowed 60 bbl. of oil in 1 hour on a 2½ hour drill-stem test at 9,500-9,785 ft. The well flowed the water blanket in 68 minutes and clean oil, which tested 38.2° gravity, at the end of 90 minutes. Operators were to drill ahead and make another test. Location is ½ mile south and ¼ mile west of production in the field.

Forty-eight locations in 17 counties, in-

cluding 6 wildcats, made up the week's new work. Counties receiving wildcat locations were: Ector, Hockley, Midland, Reagan, Shleicher and Ward. Total locations, by counties were: Hockley 9, Pecos 7, Andrews 5, Crane and Winkler 4, Ector 3; Coke, Crockett, Lamb, Reeves and Upton 2 each; and 1 each in Dawson, Midland, Reagan, Schleicher, Scurry and Ward counties.

Cochran and Ector counties accounted for 2 wildcat discoveries completed, and the balance of 41 oil wells and 3 dry wells were in the following counties: Andrews 4 oil, Cochran 1 oil, Coke 1 oil, Crane 2 oil, Crockett 2 oil, Dawson 1 oil, Ector 3 oil, Gaines 1 oil, Hale 2, Hockley 12, and 1 dry hole; Howard 2, Pecos 4, Reeves 1, Ward 2 dry, Winkler 2, and Yoakum 2. The Levelland-Whiteface area of Hockley County has shown a steady development over the past several weeks, and accounted for 11 oil wells and 1 dry hole last week. The other Hockley completion was in Slaughter.

WEST TEXAS SUCCESSFUL WILDCATS (DISTRICTS 8 AND 7-C)

Cochran County: Atlantic Refining Co. 1 F. O. Maston, Labor 15, League 132, Carson CSL Sur., 16 mi. SW Morton, pumped 42 bbl. of 27°-gravity oil, plus 25 bbl. water, San Andres 4,950 ft., elev. 3,816 ft.

Ector County: J. W. McMillen et al 1 J. H. Emmons, Sec. 8, Blk. 42, T&P Sur., 5 mi. SW Odessa, pumped 242 bbl. 35°-gravity oil a day, Grayburg 4,465-4,520 ft., TD 4,550 ft., elev. 2,917 ft.

SOUTHEAST NEW MEXICO WILDCAT FAILURE

Lea County: Amerada Petroleum Corp. 1 State-SCA, SW SE 3-12s-32e, dry, TD 3,616 ft., anhydrite 1,490 ft., salt 1,600 ft., Yates 2,300 ft., Queen sand 3,122 ft., San Andres 3,595 ft., elev. 4,416 ft.

ILLINOIS

Hamilton County Well on Pump at 244 Bbl. Per Day

MATTOON.—The Gulf Refining Co. B1 Mary Parks, NE NE SE 34-6s-5e in Hamilton County was plugged back to 3,386 ft. after drilling to 3,549 ft. The well on a pump test of the O'Hara, 3,364-86 ft., produced 244 bbl. of oil and 25 bbl. of water per day. The outpost is located south of Rural Hill and east of Rural Hill West.

The Cities Service Oil Co. 1 R. T. Bryant, SE SE SW 5-2s-9e in Wayne County on a 1-hour drill stem test at 3,228-46 ft. recovered 90 ft. of oil and 30 ft. of oil-cut mud. A drill-stem test for 1 hour at 3,336-56 ft. recovered 30 ft. of oil and 120 ft. of salty oil cut mud plus 120 ft. of salt water.

The Gilliam Drilling Co. 1 G. Seitz, NW NW SE 23-1s-13w, in Wabash County and south of Mt. Carmel West, on a test of the Cypress pumped 20 bbl. of oil per hour after a 20-qt. shot.

ILLINOIS SUCCESSFUL WILDCATS

Clay County: Ashland Oil & Refining Co.-Calvert & Willis 1 Bemis, SW SE NE 8-3n-8e, IP 365 bbl., Rosiclare & McClosky, TD 3,094 ft.

Wabash County: Gilliam Drilling Co. 1 G. Seitz, NW NW SE 23-1s-13w, IP 219 bbl., Cypress, TD 2,288 ft.

ILLINOIS WILDCAT FAILURES

Fayette County: Deep Rock Oil Corp. 1 L. Deeren, SW SE SW 7-6n-2e, dry, TD 2,044 ft.

Wabash County: F. Heldt 1 H. A. Carrie, SE NE NE 32-2n-12w, dry, TD 1,638 ft.

Washington County: Paul Doran 1 Neuhaus, SE SE NW 19-1s-1w, dry, TD 1,724 ft.

Wayne County: National Associated 2 J. H. Henson, NE NW NW 27-2n-5e, dry, TD 3,027 ft.

NPC Committee Named to Study L.P.G. Situation

WASHINGTON.—Appointment of a committee headed by W. K. Warren, Warren Petroleum Corp., Tulsa, to study the liquefied petroleum gas situation, including production and transportation facilities, and report, with such recommendations as it may find advisable, to the National Petroleum Council, was announced February 6 by Council Chairman Walter S. Hallanan.

Hallanan explained it is generally believed that facilities for production were being installed faster than transportation was becoming available but that some members of the industry have expressed the opinion that the trend may now have been reversed.

Members of the committee are: Louis Abramson, Jr., Petrolane Gas Co., New Orleans; C. M. Ambrose, Liquefied Gas Corp., Seattle; C. F. Dowd, Tide Water Associated Oil Co., New York; Louis M. Faber, Retail Gasoline Dealers Association, Milwaukee; J. M. Gardiner, Republic Oil Refining Co., Pittsburgh; H. T. Goss, Arkansas Fuel Oil Co., Shreveport; B. C. Graves, Union Tank Car Co., Chicago; Charles S. Jones, Richfield Oil Corp., Los Angeles; R. S. Mitchell, Shell Oil Co., Inc., New York; C. R. Musgrave, Phillips Petroleum Co., Bartlesville; Irving Slossberg, Lehigh Petroleum Corp., Norwich; H. K. Strickler, Protane Corp., Erie; L. L. Tonkin, Hope Natural Gas Co., Clarksburg, W. Va.; J. W. Vaiden, Skelly Oil Co., Tulsa; R. J. Walshe, The Texas Co., New York; Howard D. White, Liquefied Petroleum Gas Association, Chicago; and C. R. Williams, Natural Gasoline Association of America, Corpus Christi.

Decision on Elk Hills Extension is Postponed

WASHINGTON.—The Interior Department has extended until February 17 the time within which objections or supporting briefs regarding the proposed enlargement of the Elk Hills Naval Reserve may be filed, based on the public hearing at Los Angeles January 15. The extension was granted because of protests that the 15 days originally allowed was not adequate for a thorough study of the record and preparation of arguments.

Following the conclusion of the argument, the decision of the department will be sent to Congress for the action necessary to permit the proposed expansion of the reserve area.

California Group Starts News Letter

The Conservation Committee of California Oil Producers has begun publication of a quarterly news letter designed to keep members better informed on production and conservation problems in the state. The first issue features a brief review of the committee's work since it was first set up in 1929.

Army Permits Sought For South Texas Areas

HOUSTON.—Blanket permits allowing all installations necessary for oil drilling and development in two Lower Texas Gulf Coast areas have been asked from the Army District Engineers office in Galveston.

The Texas Co.'s South Texas division producing department asked a permit covering 11 state tracts adjacent to the northeast shore of Corpus Christi Bay near Ingleside, San Patricio County. The Texas Co. also asked permission to lay a 2½-in. gas pipe line on the bottom of Carancahau Bay about 15 miles northeast of Port Lavaca, Calhoun County. The second blanket permit was asked by W. L. Goldston, Houston operator, for work on a state tract in Matagorda Bay north of Port O'Connor, Calhoun County.

Seven Awarded Leases In Laguna Madre Area

AUSTIN.—Seven operators last week were awarded mineral leases on 93,533 acres of submerged land along the Lower Gulf Coast in the Laguna Madre area.

The awards were made by the State School Land Board which had delayed definite action on the bids pending surveys to determine that the areas involved were a part of the public school lands. The bids were taken at the November 4 general sale.

Bonus on the Laguna Madre area bids totaling $2,511,890—an average of $27.62 per acre—in addition to the regular one-eighth royalty and rentals were entered. Oil interests receiving the awards were Sun Oil Co., Pure Oil Co., Superior Oil Co., Humble Oil & Refining Co., W. F. Weeks, James A. Patton, and W. M. Averill.

Survey to Open Office

The geological survey has announced that it will establish a new district office at Oklahoma City to direct water investigation in Oklahoma. Sherman K. Jackson, assistant district engineer at the Fort Smith, Ark., office which has previously directed the work in Oklahoma, has been named in charge of the new Oklahoma City office.

Gulf Stock Bought

South Penn Oil Co. has purchased 150,000 shares of capital stock of Gulf Oil Corp. at $59 per share, a total investment of $8,850,000.

STATISTICS and T

WEEKLY WELL COMPLETIONS . . . WEEK ENDED FEBRUARY 7, 1948

	Total of all wells					Cum.		Wildcat completions and discoveries					Cumulative total, 1948				
	Comp.	Oil	Gas	Dry	Footage	1948	1947	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	27	13	0	*14	29,401	201	166	0	0	0	0	0	0	0	0	0	0
Pennsylvania	52	22	4	†26	91,389	373	373	0	0	0	2	2	0	0	0	7	7
West Virginia	8	3	5	0	21,133	82	88	0	0	0	0	0	0	0	7	9	16
Ohio	14	2	6	16	41,135	122	149	0	0	0	0	0	1	0	2	4	7
Indiana	23	11	2	10	35,816	102	48	1	0	0	1	2	1	0	0	1	2
Kentucky	11	3	1	7	22,522	73	44	1	0	0	2	3	1	0	0	3	4
Illinois	31	23	0	8	86,635	233	212	2	0	0	4	6	5	0	0	34	39
Michigan	13	5	0	8	29,087	91	86	1	0	0	6	7	3	0	3	33	39
Kansas	43	28	5	10	135,981	316	297	1	0	0	4	5	5	0	0	35	40
Neb., Mo., Iowa	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Oklahoma	66	39	3	24	248,200	429	429	2	0	0	12	14	16	0	3	80	99
Texas	186	130	7	49	837,789	1,171	813	9	4	2	21	36	36	4	8	233	281
North Central (Dist. 7-B & 9)	59	35	1	23	167,670	354	252	2	0	0	7	9	17	0	0	85	102
West (Dist. 7-C & 8)	44	41	0	3	203,852	302	210	2	0	0	0	2	5	0	0	18	23
Panhandle (Dist. 10)	10	6	3	1	30,766	69	47	0	0	0	0	0	0	0	0	0	0
Eastern (Dist. 5 & 6)	10	7	1	2	52,458	68	47	0	0	0	2	2	3	0	0	21	24
Gulf Coast (Dist. 2 & 3)	39	25	0	14	254,356	201	182	3	3	0	7	13	7	3	3	57	70
Southwest (Dist. 1 & 4)	24	16	2	6	128,687	177	75	2	1	2	5	10	4	1	5	52	62
Louisiana	30	18	1	11	196,192	203	130	1	0	1	0	2	3	1	1	14	19
Northern	11	6	0	5	35,665	132	58	0	0	0	0	0	0	0	0	9	9
Southern	19	12	1	6	160,527	71	72	1	0	1	0	2	3	1	1	5	10
Arkansas	5	2	0	3	29,643	45	21	0	0	0	2	2	1	0	0	13	14
Mississippi	3	1	0	2	24,491	42	43	0	0	0	1	1	2	0	0	9	11
Southeastern States	1	0	0	1	2,727	6	5	0	0	0	1	1	0	0	0	5	5
Montana	3	3	0	0	7,425	30	22	0	0	0	0	0	1	0	0	5	6
Wyoming	7	5	0	2	26,952	49	27	0	0	0	0	0	3	0	0	3	6
Colorado-Utah	6	4	0	2	33,096	35	19	0	0	0	2	2	0	0	0	4	4
New Mexico	8	6	1	1	32,666	74	51	0	0	0	1	1	1	0	0	3	4
California	46	39	0	7	144,014	287	215	0	0	0	4	4	1	0	0	31	32
Total United States	583	357	35	191	2,076,294	3,964	3,239	16	4	3	63	88	80	5	24	526	635
Total previous week	674	368	56	250	2,194,486	3,381	2,722	8	0	5	100	113	62	1	21	463	547
Total February 8, 1947	517	266	62	189	1,894,414			9	5	4	67	85	61	8	15	407	491

Service wells included: *14, †23, ‡2.

CRUDE PRICES AND REFINERY ACTIVITY

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$2.17			
19-19.9	2.19			
20-20.9	2.21	$2.25		$2.12
21-21.9	2.23	2.27		2.14
22-22.9	2.27	2.29		2.16
23-23.9	2.30	2.31		2.18
24-24.9	2.34	2.33	$2.56	2.20
25-25.9	2.38	2.35	2.58	2.22
26-26.9	2.41	2.37	2.60	2.24
27-27.9	2.45	2.39	2.62	2.26
28-28.9	2.49	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.56	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.62	2.49	2.72	2.36
33-33.9		2.51	2.74	2.38
34-34.9		2.53	2.76	2.40
35-35.9		2.55	2.78	2.42
36-36.9		2.57	2.80	2.44
37-37.9		2.59	2.82	2.46
38-38.9		2.61	2.84	2.48
39-39.9		2.63	2.86	2.50
40 and above		2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point. †Includes Lea County, New Mexico.

A.P.I. REFINERY REPORT, WEEK ENDED JANUARY 31

(Thousands of barrels)

District—	Crude runs, daily avg.	Production: Gasoline†	Kerosine	Gas & dist. oil	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline*	Kerosine	Gas & dist. oil	Residual
East Coast	765	1,748	413	1,504	1,540	20,852	4,791	10,418	6,762
Appalachian:									
District 1	101	299	50	81	95	2,300	268	531	393
District 2	72	249	33	80	108	1,267	136	288	149
Ind., Ill., Ky.	864	2,813	479	883	1,132	19,629	2,031	5,341	4,383
Okla., Kans., Mo.	458	1,586	178	579	511	9,672	649	2,420	1,545
Inland Texas	262	1,071	128	168	468	3,873	418	414	819
Texas Gulf Coast	1,363	3,681	701	2,345	1,852	18,188	1,381	5,514	6,788
La. Gulf Coast	436	1,237	372	769	574	5,858	749	1,770	1,468
N. La. & Ark.	80	204	60	80	123	2,009	248	360	166
Rocky Mountain:									
New Mexico	12	34	4	10	26	87	25	21	30
Other Rocky Mtn.	156	480	38	176	338	2,510	132	715	621
California	865	2,584	105	1,015	2,374	16,728	874	12,788	27,715
January 31, 1948	5,434	15,986	2,561	7,690	9,141	102,913	11,702	40,580	50,839
January 24, 1948	5,446	16,747	2,403	7,718	9,182	100,586	11,997	42,402	51,094
February 1, 1947	4,729	14,426	2,033	5,453	8,567	98,696	13,732	48,197	47,134

*Finished and unfinished. †At refineries including natural blended.

Bureau of Mines crude-oil stocks 221,663,000 bbl. as of January 31—down 252,000 bbl. One year ago 223,737,000 bbl.

FLAT CRUDE PRICES

Representative posted schedules per bbl.	
East Texas	$2.65
Kettleman Hills, California*	2.14
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	1.85
Bradford, Pennsylvania	5.00
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

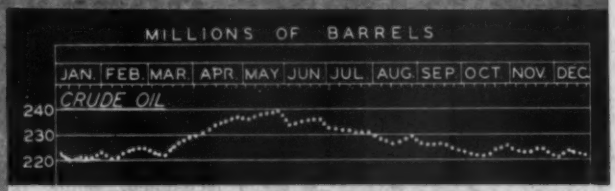
	Feb. 7 crude oil	B. of M. Jan. demand	Jan. 31 crude oil
Alabama	1,350	1,500	1,250
Arkansas	87,500	82,000	87,750
California	932,500	930,000	934,200
Colorado	46,870	47,000	46,100
Eastern	59,970	64,900	60,520
Florida	675	1,000	800
Illinois	174,700	185,000	168,900
Indiana	19,400	16,000	18,800
Kansas	271,800	306,000	296,050
Kentucky	25,700	26,000	25,600
Louisiana	474,150	453,000	472,550
North Louisiana	120,900	.....	118,550
South Louisiana	353,250	.....	354,000
Michigan	47,700	45,000	45,950
Mississippi	107,475	106,000	114,250
Montana	22,410	24,000	23,960
Nebraska	500	600	500
New Mexico	125,000	125,000	123,100
Oklahoma	409,350	405,000	403,750
Texas	2,432,825	2,310,000	2,385,700
Dist. 1 (Southwest)	25,700	.....	25,600
Dist. 2 (Southwest)	172,100	.....	168,350
Dist. 4 (Southwest)	254,675	.....	255,500
Dist. 3 (Gulf Coast)	498,450	.....	496,750
Dist. 5 (Eastern)	44,325	.....	44,125
Dist. 6 (Eastern)	122,500	.....	120,875
East Texas Field	315,000	.....	294,500
Dist. 7-C (West)	44,350	.....	42,875
Dist. 8 (West)	678,850	.....	659,250
Dist. 7-B (W. Central)	45,100	.....	42,950
Dist. 9 (N. Central)	145,425	.....	142,725
Dist. 10 (Panhandle)	86,350	.....	92,200
Wyoming	129,230	127,000	133,470
Total United States	*5,369,105	5,255,000	5,343,200
Change from prev. wk., up	25,905		

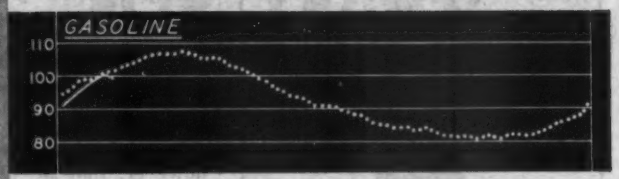
Total production January 1-February 7... †204,737,065 bbl.
Same period last year (crude plus cond.).. 178,217,120 bbl.

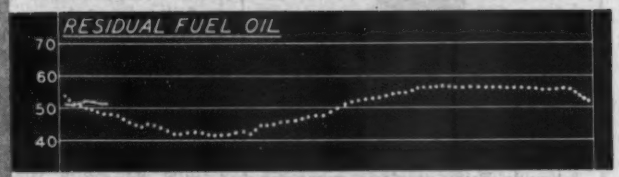
*Not incl. 51,705 bbl. condensate. †Incl. 1,841,565 bbl. condensate.

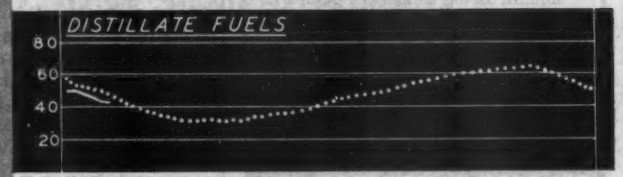
STOCKS IN UNITED STATES

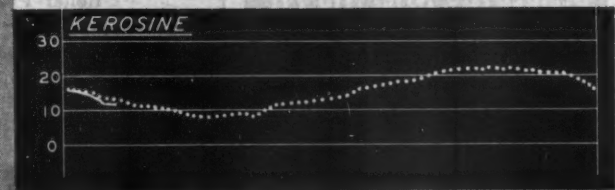
---- 1947 ——— 1948





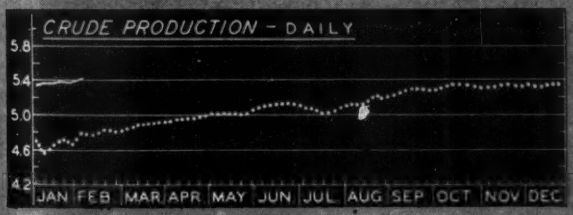






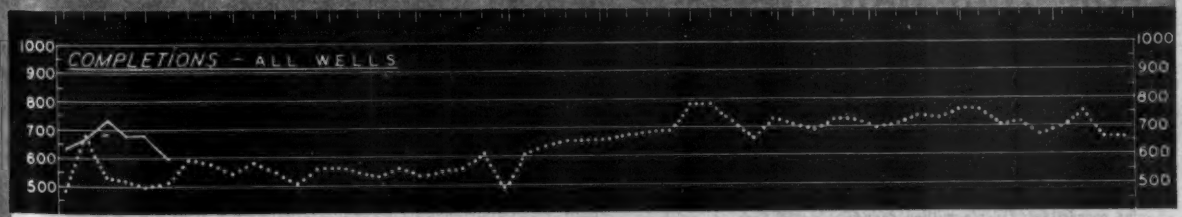
DAILY OPERATIONS

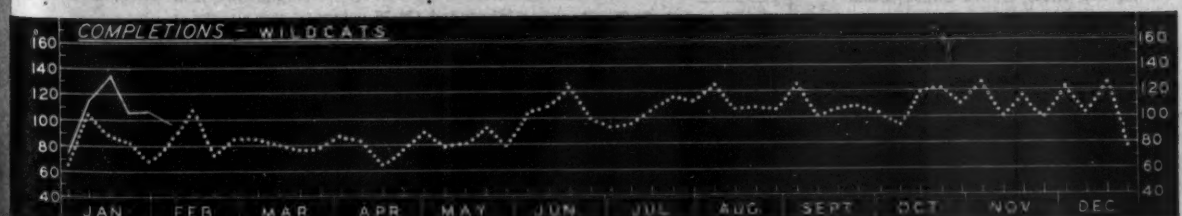
---- 1947 ——— 1948



WEEKLY COMPLETIONS

---- 1947 ——— 1948





PENBERTHY
EJECTORS

Use the power of steam, air or water under pressure to lift liquids. Being simple jet pumps they have no moving parts and require no lubrication. A variety of models to meet different conditions. Also used as water heaters.

PENBERTHY INJECTOR CO.
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

LOOK

FOR THIS CAN ON YOUR SUPPLY STORE SHELF

Use it on every threaded connection and you'll never be troubled with leaking connections. Over a million pounds used by the Industry in nine years.

Manufactured in Houston, Texas, by
RECTOR WELL EQUIPMENT CO., Inc.
Gen'l. Offices: Fort Worth, Texas

RECTORSEAL
THE POSITIVE LEAK PREVENTER

MARKETS

REPORTS from some buyers in the New York Harbor area indicated that no fuel oil at any price was available on the open market. Quoted spot prices in general remained unchanged. Some price advances in kerosine were reported. Because of the continued cold weather, demand for heating oils remained strong and according to Eugene Holman, president of Standard Oil Co. (N. J.) the East Coast's fuel oil "pinch" won't be over for another 5 weeks. He said, however, that he thought the worst of it was past.

Gasoline and Bunker C fuel stocks were reported as showing a slight increase by some suppliers. Jersey Standard officials indicated that gasoline supplies would not be particularly tight this summer, despite predictions by some that gasoline would be in very short supply because of the cutbacks by refineries to meet the extremely heavy demand for fuel oil.

The Navy last week released 100,000 bbl. of light fuel oil to tide over New York State, plus 200,000 bbl. of heavy fuel oil for industrial furnaces.

Relief Provided

Esso Standard Oil Co. reported in addition to supplying its regular customers over the amounts they were given in January of last year, it has made available to emergency pools approximately 7,000,000 gal. of kerosine and home heating oil for relief of local hardship cases.

In the Mid-Continent area demand for No. 2 continued strong and little material was moving on the spot market. One supplier reported getting an "offer" of No. 2 at 14 cents, buyer's cars. No drop in prices of gasoline shipments were reported, but demand settled down somewhat due to widespread weather conditions that brought traffic to a near standstill.

One large marketer in the Mid-Continent area increased its posted spot-tank-car price for No. 6 fuel oil from $2.65 to $2.75.

To ease demand in the Midwest Standard Oil Co. (Ind.) reported that it has in recent months diverted 1,555 tank cars from hauling gasoline and other petroleum products to the job of bringing more crude oil from the Southwest and West. Trucks will be substituted for the use of tank cars.

Gulf Coast Unchanged

In the Gulf Coast area spot market prices of petroleum products appeared to be generally unchanged despite continued pressure of extremely heavy demand. Some small quantities of materials were reported available on the spot market.

Some water shipments of 70-octane motor fuel were reported to have moved at 12½ to 13½ cents; premium gasoline, tank car, at 13½ cents; and No. 2 heating oil at 12 cents. No. 6 fuel oil, cargo, continued to move at a high of $3.50 per barrel with prices around $3 for tank-car shipments.

Along the Atlantic seaboard and in the New York Harbor area, there was a reported "slight but noticeable" easing in the availability of tankers. One observer in the Mid-Continent area saw in this some hope for an easing of the particularly tight situation of tank cars throughout the Midwest.

Representative Quotations

Representative spot-market quotations of leading suppliers as of February 9, 1948. Figures are f.o.b. plant for tank-car shipment in cents per gallon except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor	Texas Gulf Coast
Regular gasoline, 73-75 octane	10½-11½	11.6-12* 10.5-12.2†	10.9-13
Premium gasoline, 78-80 octane	11¾-12½	10.6-13.4	12.9-13½
42-44 w.w. kerosine	10-10½	9.8-10.8	10¼-12
No. 2 straw fuel oil	9⅛-11	8.9-9.9	9.05-11½
No. 6 residual	$2.50-2.90	$3.03-3.90	$2.56-3.50

*Branded (74-76 octane); †Unbranded (74-76 octane).

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	8½	8	8¼
Grade 18-55	10.2	9.6	9.9

LUBRICATING OILS

South Texas	
200 vis., No. 2-3 neutral	13-14.5
750 vis., No. 3-4 neutral	15-17.25
2,000 No. 5-6 neutral	17-18½

LUBRICATING OILS

Mid-Continent	
150-160 vis., D bright stock, 0-10 pp.	30-33
200 vis. No. 3 neutral, 0-10 pp.	20-21
Western Pennsylvania	
145-155 vis. 10 p.t. br ght stock	47
180 vis. p.t. neutral	45

CRUDE-SCALE WAX

Mid-Continent	
130-132 A.S.T.M. melting point	8½-9¼

SERVING the GREAT OIL INDUSTRY FOR YEARS!

McNamar SPECIALIZES IN THE MANUFACTURE OF

- Oil Refinery Equipment of every type
- Gasoline Plant Equipment
- LP-Gas Equipment
- Storage Tanks
- Skid Tanks
- Pressure Vessels of every type

READY DELIVERY . . . EVERY ORDER HANDLED PROMPTLY

We invite you to write, wire, or telephone for complete information

McNAMAR BOILER & TANK CO.

Box 868 Tulsa, Okla.

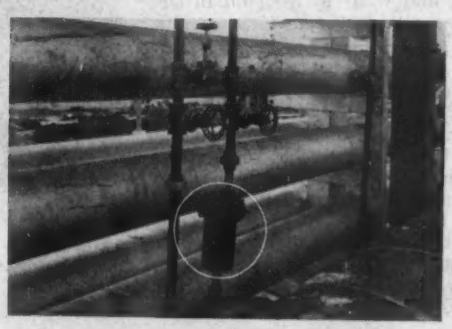
HOW TO GET *DEPENDABLE* CONDENSATE DRAINAGE OF HEAT EXCHANGERS...

In many plants Armstrong Forged Steel Steam Traps are "standard" on reboilers, tank heaters and other heat exchange equipment involving tubes or coils where dependability and continued trap operation is essential to the process. Forged steel cap and body and stainless steel interior mechanism for pressures to 1500 psi. provide the "all-steel" installations and the extra margin of safety demanded by most plants today. Freedom from air binding, ability to handle ordinary dirt and scale, automatic discharge of air along with condensate, freedom from steam loss, large capacity for size and long-wearing parts provide the dependability also demanded by users.

For best results specify Armstrong Forged Steel Inverted Bucket Steam Traps.

SEND FOR STEAM TRAP BOOK. The Armstrong Steam Trap Book gives complete data on trap selection for heat exchangers—how to figure condensate loads . . . safety factors to use . . . trap capacities, prices, etc. Write for your copy.

ARMSTRONG MACHINE WORKS
868 Maple St. Three Rivers, Mich.



USE ARMSTRONG FORGED STEEL TRAPS

IF IT'S A TRAPPING JOB . . .

Steam Traps • Air Traps • Gasoline/Water Traps • Purgers

EQUIPMENT MEN ... in the News

Smith Named Southwestern Sales Manager

E. E. SMITH

E. E. Smith has been appointed manager of sales of National Tube Co. for the southwestern area, with offices at Dallas.

The announcement was made by H. J. Wallace, general manager of sales, at a district sales conference in Gulfport, Miss., attended by managers of National Tube Co. divisions at Dallas, Denver, Houston, New Orleans, and Tulsa. Smith will have general supervision over these five divisions.

Also announced was the appointment of James R. Boax as manager of sales at Houston, succeeding Smith.

A graduate of Carnegie Institute of Technology, Smith spent several years in the engineering and operating departments of the company's National Works at McKeesport, Pa., before going to Texas as a field engineer in 1929. He served as director of service for National Tube's sales department, was made manager of sales at Tulsa in 1943, and went to Houston in the same capacity last year.

Boax is a graduate of Syracuse University and has had 17 years' experience with National Tube and Oil Well Supply Co. After 4 years with the operating department at National Works, he became a field service engineer in 1934. Subsequently he was a salesman for National Tube in Tulsa, district manager of tubular sales for Oil Well Supply, assistant priorities administrator of National Tube during the war, and recently a salesman in the Houston ofice.

Butler Acquires California Plant

Butler Manufacturing Co., Kansas City, has purchased a factory building at Richmond, Calif. The property, in the San Francisco Bay area, was purchased from Santa Fe Land Improvement Co. The Kansas City company leased, with purchase options, the 12½-acre site on which the building stands.

The main factory building is one-story, 400 by 413 ft., and is 70 ft. high. With annexed buildings, there are 179,000 sq. ft. of floor space. One end of the building is open to accommodate the five 80-ft. craneways, each extending 100 ft. beyond the building. The outside paved working area approximates 250,000 sq. ft., of which 41,000 sq. ft. are serviced by the extended craneways.

The Richmond division manager will be Paul M. Shoemaker, at present assistant to the Galesburg division manager. Other executives who will be transferred to Richmond to manage and direct initial operations are: R. G. Burge, Richmond factory superintendent, who is now the Kansas City factory superintendent; Charles R. Crain, Richmond factory personnel manager, who has that position now at the Kansas City plant; and Lloyd A. Anderson, Richmond steel buildings sales manager, who at present is steel buildings sales manager at the company's Minneapolis plant. Other personnel changes incident to the starting of the new division will be announced later.

Parkhill Buys Back Truck Company

Roy F. Parkhill, pioneer pipe-line and oil-industry trucker and pipe stringer, has bought back Parkhill

R. F. PARKHILL

G. W. FOWLER

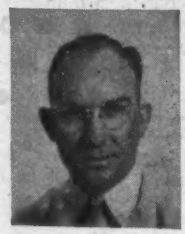
Truck Co., Tulsa, which he sold 2 years ago to Mid-Western Constructors, Inc., Tulsa.

Parkhill is completing plans for remodeling the offices and plant facilities located at 2000 East Jasper Street. In addition, he has purchased all the heavy transportation equipment owned by Boughton Machinery & Cartage Co. of Chicago, which was located at Deming, N. M., for $90,000. This equipment consists of heavy diesel tractors, diesel trucks, cranes, road-maintenance equipment, etc.

Parkhill has taken into partnership in his company Gant W. Fowler, who also is vice president and general manager. Fowler was consulting engineer for Mississippi River Fuel Corp. and previously had been connected with Williams Brothers Corp. and H. C. Price Co.

Totco Appoints Snyder and Moore

E. S. Snyder and T. L. Moore are now serving in field positions for Technical Oil Tool Corp., Ltd. Sny-



T. L. MOORE

E. S. SNYDER

der is serving in the fields in Mississippi and the Southeast, with headquarters at Brookhaven, Miss., while Moore is working in South Texas with headquarters at Alice.

Both men are thoroughly experienced in the application of the Totco recorder in controlled vertical-drilling work and regularly visit every drilling well in their respective territories. They are also on call for consultation on controlled vertical-drilling techniques at any time.

Bryan & Bryan to New Offices

Bryan & Bryan Advertising, an agency in Shreveport, specializing in oil-industry accounts since 1920, has moved its offices from a downtown building into an old colonial home at 615 Jordan Street.

The house, built before 1900, has been completely modernized inside, but the old southern atmosphere has been carefully preserved. There are 18 beautifully appointed offices on the first and second floors with summer and winter air conditioning throughout.

Falk Announces Promotions

Falk Corp., Milwaukee, recently announced the promotions of Harry Green and Carl Senn to consulting positions on the company staff. Early this month Green assumed his duties as consultant on machine-shop operations, while Senn became consultant on methods engineering.

B. C. Bugbee, former production control manager, was appointed machine shop superintendent. In this capacity he directs all machine shop and production control operations. Robert Fischer is now in charge of all standards throughout the plant.

Oil Well Names Maier and Quayle

August R. Maier has been appointed director of engineering and Alexander Quayle named chief engineer of Oil Well Supply Co. Maier's new headquarters is in Dallas. Quayle will remain in Oil City, Pa.

A. R. MAIER

A. QUAYLE

A native of Germany, Maier was naturalized as an American several years after his graduation from Stuttgart Institute of Technology. He became associated with the oil industry in California, and joined Oil Well in 1930 as a development engineer at the company's Wilson-Snyder Manufacturing Division in Braddock, Pa. He was transferred to Dallas as assistant chief engineer in 1932 and was named chief engineer 4 years later.

Quayle is a native of New York. He was graduated from Stevens Institute of Technology before joining Oil Well as a field service engineer. His most recent position with the company was assistant chief engineer.

Trout Elected President

W. W. TROUT

Walter W. Trout was elected president of Lufkin Foundry & Machine Co., manufacturers of oilfield pumping equipment, at the annual meeting of the board of directors. Trout, who has been with the company 23 years, beginning as a machinist in 1925, succeeds his father, the late W. C. Trout, who had headed the foundry since its start early in the century. Walter Trout has been vice president and general manager, and since the death of his father in April 1947, has been acting head of the Lufkin industry.

W. D. Winston, Jr., who has been with the company 34 years, was elected to the board of directors, to fill the vacancy left by the death of W. C. Trout. All other officers and directors were reelected.

Vice presidents are J. H. Kurth, Jr., Houston; E. P. Trout, Lufkin; A. E. Cudlipp, Lufkin; and L. A. Little, Dallas. Winston was reelected secretary and E. H. Bounds was renamed treasurer.

The board of directors includes Walter Trout, J. H. Kurth, Jr., E. L. Kurth, Little, S. W. Henderson, Jr., Eli Wiener of Dallas, Cudlipp, Jacques Wiener of Shreveport, and Winston.

U. S. Rubber Opens Odessa Branch

United States Rubber Co. announces the opening of a new subbranch at 722 West Second Street, Odessa, Tex., for the distribution of rubber products used by the West Texas oil industry.

The new store will operate as a subbranch of the company's branch at Dallas. It will be serviced by John R. Shackelford, resident field-sales engineer, and Ed C. Stough and Joe F. Phillips of Dallas, special oil-field representatives.

Amox to Manage McAllen Store

Continental Supply Co., Dallas, has announced the transfer of H. E. Amox to the McAllen, Tex., store as manager. Amox has been serving at the Alice, Tex., store as warehouseman. He succeeds W. O. Bright, who has been appointed field salesman at McAllen.

Munn Joins Rockwell Staff

R. J. MUNN

R. J. Munn has joined the sales staff of Nordstrom Valve Division, Rockwell Manufacturing Co., Pittsburgh. He has been assigned to the Houston office where he will work under the direction of C. K. Madison, district manager. Munn will make his home in Corpus Christi, Tex., and devote his principal attention to handling the sales and service on Nordstrom valves in the oil-producing areas.

Oil Well Opens New Store

Official opening of an Oil Well Supply store at Worland, Wyo., was held February 1. Manager of the new store is Robert C. Craig.

Baker to Bartlesville

Opening of an Oil Well Supply Co. sales office at Bartlesville, Okla., with Charles A. Baker in charge, is announced. Baker has been manager of the Beaumont store since September 1938.

Fred F. Murray (seated), president of U. S. Steel's Oil Well Supply Co. and chairman of the oil-industry public-relations committee in the Gulf-Southwest, is congratulated by Gerald Cullinan (standing, left), president of the Public Relations Institute of Texas, upon his presentation by Cullinan of the Institute's top citation for public-relations achievement in trade and industry relations in 1947. Looking on the ceremony is Paul Cain, Fred Eldean Organization, oil-industry public-relations counsel

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED

All ads, 10 cents a word. Minimum charge, $2.00 per insertion.
Centered Line, any ad, 75 cents.
Box Numbers count 9 words when replies are to be sent to our Tulsa Office. Replies forwarded without charge.

DISPLAYED, PER INCH

$10.00 per column inch per insertion One-point border and 12-point capitals are allowed. Larger type sizes not accepted.

All classified advertising payable in advance.
10% Discount if 3 insertions are ordered at one time.
COPY DEADLINE, 9:00 a.m. Monday prior to each week's issue.

THE OIL AND GAS JOURNAL
P. O. Box 1260, TULSA, OKLAHOMA

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

FOR SALE: At Mansfield, Louisiana, Failing 44 shot hole drill and water truck on 42 Ford trucks. Drill recently overhauled. Kerr-McGee, Oklahoma City.

DITCHER: Buckeye Model 12, No. 3966, good condition presently working, reasonable. Knupp Construction Company, Great Bend, Kansas.

USED PIPE No. 1 GRADE

200,000′ 1″ used pipe No. 1 Grade

150,000′ 2″ used pipe No. 1 Grade

100,000′ 2½″ used pipe No. 1 Grade

7″ and 8″ used I-Beams, standard weight

BANKOFF
Pipe & Supply Co.

Telephone 6-2119 **823 No. Lewis**
Tulsa, Okla.

EQUIPMENT FOR SALE

FOR SALE: Seismograph Water Truck. Flat bed tank. Winch with draw bar. Mounted on 4 x 4 Chev. A-1 condition. $1650. Also round tank water truck. Rear winch with draw bar. Mounted on 4 x 4 Chev. $1250. Clemens Exploration, Box 136, Princeton, Indiana.

FROM DEEP WELLS

85,000 Ft.-7⅞″ } Jones 7 and Axelson 59
8,000 Ft.-1″ }
In A-1 Condition

T & T TOOL COMPANY
317 E. Third St.
Oklahoma City, Okla., Phone 5-6608

FOR SALE

12—230 H.P. Type 10 Bessemer New 17″ Power Cylinders complete ready to run with 16″ to 18″ Compressors. 1—230 H.P. Clark Horizontal with Compressors. Located Salem, Illinois.

ENGLE PETROLEUM, Incorporated
Box 655, Evansville, Indiana

12—NEW 10KW LIGHT PLANTS, AC. 120-240 Volt, Single Phase, 60 Cycle, Generator Driven by Four Cylinder "Jeep" Engine. Steel Skid Mounted, Complete Steel Housing, 12 Volt Electric Start with Battery, Panel Board, Spare Parts and Hand Tools. Export Crated ..... $980.00 each

FOB San Antonio, Texas.
HALLORAN EQUIPMENT CO
431 Kress Bldg. Houston 2, Texas
Phone Capitol 1447

NEW OR USED CABLE TOOLS

Stems, Bits, Jars and Swivel Sockets Made to Order

DRILLERS SUPPLY CO.

Box 64 **Joplin, Mo.**

LIQUIDATING MODERN REFINERY

Houston, Texas

PUMPS

Duplex and Simplex steam reciprocating, hot oil and general service. The hot oil pumps have liquid cooled stuffing boxes and steel heads; both types in very desirable sizes such as 6 x 4 x 6, 10 x 6 x 10, 12 x 7 x 12, and many other sizes.

HEAT EXCHANGERS

Enclosed shell and tube types with floating bundle, steel shell and some with Admiralty metal tubes, others steel tubes, in popular surface sizes.

TOWERS

Many excellent towers all welded with cast iron bubble caps and trays with manway at each tray varying in size from 7′-0″ diameter and 60′-0″ high to 4′-6″ diameter to 30′-0″ high. Most of these towers were originally ½″ thick.

GENERAL

Cracking and topping furnaces; vaporizers, receivers, absorbers, steel valves, and instruments; practically everything for a medium pressure modern refinery. Some portions of this refinery never used after installation, other units in use for moderate period of time. Before shutting down all equipment processed for protection for future operation.

Write for complete listing: Brown-Strauss Corp., P. O. Box 78, L. D. 169 (phone), Kansas City 10, Missouri.

EQUIPMENT FOR SALE

FOR SALE at our Chase, Kansas, production office, 1 used Allis Chalmers Model U-6 Skid Type Well Servicing Winch. $1750. Cities Service Oil, Patridge, Bartlesville, Okla.

STAINLESS STEEL TANKS

Surplus Air Corps Pressure Oxygen Tanks. Nine gallon capacity. 12″ dia., 24″ long. Hemispherical ends tapped for ¼″ pipe connections. Some tapped at one end only. Rated strength to 400 psi. 18 gauge pure stainless steel. $15.00 each F.O.B. Specify tapped 1 or 2 ends.

Ireland & Vice, Box 148, Auburn, N. Y.

FOR SALE

2—125 H.P. 350# Working Pressure "OIL WELL BOILERS," EXCELLENT condition. Completely reconditioned. Not used since last approval by State Boiler Inspector. Priced to sell.

POWEL BRISCOE, INC.
1916 First National Bldg.
Oklahoma City, Oklahoma

FOR SALE

12,000 Ft. 3″ standard black pipe—T & C used—like-new condition. 80c per foot. F.O.B. Chicago.

WALLACK BROS.
7400 S. Damen **Groverhill 7474**
Chicago 36, Ill.

WE BUY and SELL

Steel Pipe and Tubing
Pipe Fittings—Well Casing
Culverts and Valves

SONKEN-GALAMBA CORP.

2nd & Riverview, Kansas City 16, Kans.

PARTS FOR ARMY TRUCKS

New and Used

Largest stock in America, 6x6, 6x4, 4x4, 4x2. All items guaranteed. Largest auto wrecking house in the west with most complete stock of new and reconditioned parts for all cars and trucks. Fast service.

PIONEER AUTO WRECKING CO.
732 W. 13th Ave. **Denver 17, Colo.**

FOR SALE

Copper Tubing

5½″ OD, type K, 233 Pieces, 5′ to 19′ majority 19′, 10.68 lbs. to the foot. 3/16″ wall, 4629′.
4½″ OD, type K, 15′ to 20′, ⅛ wall. 1200′.
2⅛″ OD, type K, 20′ length, ⅛″ wall. 600′.
⅜″ OD, ⅜″ I.D., type K, 1500′.
1⅜ OD, 1⅛″ I.D., type K, 3000′.

Yellow Brass Tubing

2½″ OD, 2 5/16″ I.D., 1500′.

LOUISIANA IRON & SUPPLY CO.
2925 Mansfield Road, Shreveport, La.